# COMPUTERWORLD

## THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper.

Second-class postage paid at Boston, Mass., and additional mailing offices

Price: $12/year | © 1974 by Computerworld, Inc. | January 16, 1974 | Vol. VIII, No. 3


WEST COAST NEWS

## L.A. Postpones Second Energy Plan

CW West Coast Bureau

*(Related Story on Page 7)*

LOS ANGELES – The second phase of a tough, city Emergency Energy Curtailment Program has been postponed indefinitely, but the state Public Utilities Commission has issued its own stringent regulations.

The reprieve put off a planned 33% reduction in energy use by commercial users on Jan. 15 and possible rolling blackouts in February.

David Coriaty, president of the Association of Data Center Owners and Managers (Adcom), said the group is still working to get relief for its members from the 20% energy cutback in the city's phase 1 program.

He said 17 to 18 service bureaus here have indicated they will lose business or will have to make personnel cuts because of the 20% cut.

Energy savings achieved so far and purchase of oil by the department of water and power made the reprieve possible, city officials said.

Phase 1, however, still calls for mandatory electricity cuts of 10% on residential and industrial customers and 20% on commercial users.

The PUC order is designed to cut energy consumption by 15% throughout the state and was directed at all investor-owned utilities.

Violations of the order will result in a cutoff of power, officials said.

## Infonational to Run Equity DP Operations

LOS ANGELES – The data processing operations at Equity Funding Corp. of America, blamed by some for the firm's mammoth scandal, have been turned over to Infonational, Inc., a San Diego-based software and data processing company.

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# DP Operators Strike N.Y. Blue Cross

By Patrick Ward
Of the CW Staff

NEW YORK – Computer operators struck Blue Cross of Greater New York last week with job security the primary issue, but strikers and management gave different reasons why the operators may have felt their jobs threatened.

The day the strike began, the computer operators filed an application to join Local #3 of the International Brotherhood of Electrical Workers (IBEW) and IBEW members joined them in picketing outside Blue Cross's Third Avenue headquarters.

At the start of the midnight shift, Monday, operators put their equipment in the "wait" state.

### Still Operating

Blue Cross is still operating the computer installation and the operators merely stopped the units without any malicious damage from the strikers, Vice-President for Systems David Benjamin said. Systems analysts, programmers and management people with some knowledge "are operating and doing a good job of getting the basic stuff out," Benjamin said.

Blue Cross is still able to serve its subscribers and pay hospitals, and although "we are shortcutting a little, of course," the installation is able to maintain a flow of work that keeps the clerical departments busy, he added.

A primary concern of the computer

*(Continued on Page 2)*

CW Photos by V.J. Farmer

New York City Blue Cross computer operators picket outside Third Avenue headquarters. Systems analysts, programmers and management personnel are running Blue Cross's computers to keep up service to 8.7 million subscribers in the greater New York area.

# Travelers Adopts SSN... But Smith Won't Go Along

By Marguerite Zientara
Of the CW Staff

HARTFORD, Conn. – A major insurance company here, after "a lot of soul-searching," has instituted a new policy identification system using Social Security numbers (SSN) in place of policy numbers for personal life insurance.

And at least one policyholder is incensed at what he calls "an unwarranted invasion of my privacy."

L. Wheaton Smith, a senior management-level DPer in Palo Alto, Calif., said: "The potentials for abuse of privacy – and worse – are very great when computer files from many organizations can be merged either on a selective or general basis. A common, presumably, unique, identifier is the key to doing this economically."

Smith refused to supply his SSN to the Travelers Insurance Co., and was issued an alternative number. He is personally satisfied but commented: "I think the system they have is atrocious in that most people wouldn't take the trouble to argue with them. Only when great protest was raised did they back down."

### Matter of Efficiency

Ronald Zgoda, secretary of Travelers, cited efficiency and convenience for Travelers' switch to SSNs as identifiers. "A

*(Continued on Page 4)*

## Government Exposes Standard Failures

# Cobol Compiler Tests Give Users Hope

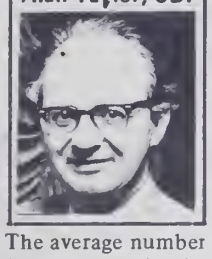
The first U.S. government examination of a Standard Cobol compiler, just released, shows two things:

- The compilers currently on the market fail to conform to the Ansi standard specification – resulting in incorrect computations at object time, wrong instructions given to operators and lack of claimed machine independence. And all in the *standard* parts of the compiler, not just in extensions!
- Compiler testing has now progressed to the level where it becomes practical to really test compilers.

Thus, Cobol users can expect in the future to have much better quality compilers. Currently, however, they must live with the fact that the compiler state of the art, revealed in the U.S. test, falls woefully under what most people believe.

So far, the program, run by the Navy for the National Bureau of Standards, has tested about 80% of the commercial compilers. Preliminary results indicate none of these passed the tests the first time with under 30 errors. The average number of failure tests is believed to be in the 70-upwards area.

**The Taylor Report**
**By**
**Alan Taylor, CDP**



It is still not clear just how bad the commercial situation is, and it will not be for some time. This is because the reports are only published after they have been "agreed" with the manufacturers, and this can take months!

One such agreement – with IBM regarding Version 2 of the full ANS Cobol compiler running under Release 21.6 of the IBM operating system – is the first to reach this point, although others are approaching it.

### Would You Believe . . .?

The failures to obey standards are not confined to trivial points, like the operating of margin B or the treatment of C-level error messages. In a number of cases the test showed arithmetically wrong results being produced by the compiler!

*(Continued on Page 11)*

```
049700  MOVE      LAST-LINE TO PRINT-REC.                          SQ2185.4
049800  WRITE     PRINT-REC BEFORE ADVANCING NEW-PAGE.             SQ2185.4
049900      NOTE  WRITE THREE LINES ON THIS PAGE, LEAVE NEXT PAGE  SQ2185.4
050000            BLANK, AND GO TO NEW PAGE.                       SQ2185.4
050100  MOVE      NOTE-5 TO PRINT-REC.                             SQ2185.4
050200  WRITE     PRINT-REC AFTER ADVANCING NEW-PAGE.              SQ2185.4
```

The above Cobol program was used as one of the tests applied by the Federal Cobol Compiler Testing Service while testing the IBM full ANS Compiler. The sequence should have yielded a blank page, but failed to do so. The test took 11 seconds to compile and link edit, and a third of a second to execute on an IBM 370/155.

## NRMA Shows POS Way to Go

By Toni Wiseman
Of the CW Staff

NEW YORK – Point-of-sale systems are definitely the "in thing" this year in the world of merchandising.

This was evident in the number of POS systems and related peripherals, equipment and services on display at the Annual National Retail Merchants Association (NRMA) convention here, at the Americana and Hilton hotels.

*(Continued on Page 4)*

## But No Penalties for Failure to Correct

# NCIC Safeguards Publicized, Give Right to Challenge

By E. Drake Lundell Jr.
and Marguerite Zientara
Of the CW Staff

WASHINGTON, D.C. – The FBI has spelled out for the first time publicly "safeguards" for information contained in the controversial National Crime Information Center/Computerized Criminal History (NCIC/CCH) system that would give individuals the right to examine their files and challenge the information in them.

In addition, the FBI, in a three-page report in the January *Law Enforcement Bulletin*, indicated the files would include only records on serious offenders and made an attempt to limit the dissemination of the information to criminal justice agencies.

All states with access to the NCIC/CCH, the report said, have signed an agreement adhering "to the principle that an individual has the right to see and challenge the contents of his NCIC/CCH record." FBI officials contacted later said this had always been a requirement guaranteed by states accessing NCIC/CCH, even though they admitted it was not widely publicized.

However, it seems the only penalty for not obeying this mandate would be the loss of access to the system.

Currently only six states are tied into the CCH portion of the system.

If a person has a record in the NCIC/CCH system, the report said, he could request access to that record after presenting "appropriate identification," including fingerprinting, to establish his identity.

He would present this, not to the NCIC/CCH people here, but to the local law enforcement agency with access to the file, which then can receive the record either on-line, if it has that capability, or through the mail if it does not.

While the individual has the right to challenge the information in the file, there are apparently no penalties to agencies which refuse to correct the file or which disagree that the information is wrong. Also, there appear to be no real arbitration procedures to correct the information.

In defending the system FBI Chief Clarence Kelley, in the article, said: "The NCIC is not, as some have alleged, a secret intelligence network filled with loosely managed and frivolously gathered information concerning anyone coming to the attention of the police.

"The facts about the NCIC stand out in bold contrast to such assertions," he added.

The major challenge to the system came last summer when Gov. Francis Sargent of Massachusetts and four members of Congress, Sens. Edward Brooke (R-Mass.), Harold Hughes (D-Iowa) and Reps. Barry Goldwater Jr. (R-Calif.) and Michael Harrington (D-Mass.), asked that use of the NCIC/CCH be suspended because it did not protect individual privacy and disseminated outdated information as well as permitting unauthorized access.

In his defense, Kelley said NCIC/CCH "is prudently managed and directed by skilled professionals of the criminal justice system."

As an example, he claimed the NCIC/CCH information may be retrieved by criminal justice agencies only and it "is not authorized to be disseminated for use in connection with licensing or local or state employment, other than criminal justice agency, or other uses unless such dissemination is pursuant to federal and state statutes."

He did not mention that most states have statutes permitting the dissemination of such information for licensing procedures.

In response to the FBI's announcement, a spokesman for Massachusetts Gov. Sargent's office said: "The same faults that we pointed out originally are still in there. The system relies on good faith, on vague promises and wishes but there's nothing in there by statute or specific regulations that guarantees the kind of controls this program must have to ensure the rights of the individual."

Last summer Sargent joined the American Civil Liberties Union in seeking an injunction against CCH until regulations to safeguard its operation were passed. When then Attorney General Elliot Richardson promised the state's wishes would be complied with, the suit was dropped.

Andrew Klein, the Sargent spokesman, maintained that while the rules state that information should only be kept on serious offenses, they do not define "serious." He further noted, "There's no guarantee that they will update arrests."

"Except for the one about the right to see your file, which they've corrected and which Sargent is very pleased about, they've not met any of the other objectives," Klein stressed. "In fact, what they've done mostly is pass the buck onto the states."

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM Reg. U.S. Pat. Off.

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Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160. © 1974 by Computerworld, Inc.

50 cents a copy; $12 a year in the U.S.; $13 a year in Canada; all other foreign, $36 a year. MARGARET PHELAN, *circulation manager.* Four weeks' notice required for change of address. Address all subscription correspondence to circulation manager, Computerworld, 797 Washington St., Newton, Mass. 02160

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*Computerworld* can be purchased on 35mm microfilm in half-volumes (six-month periods) through University Microfilm, Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. ad

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# DPers Strike N.Y. Blue Cross

*(Continued from Page 1)*

operators is an alleged order given to their acting operations manager to fire three computer operators who had made an error in their work. The acting operations manager refused to release the men because of their previous good records, according to Peter Petino, spokesman for the computer operators on strike.

Company officials escorted the manager "out of the building and told him he had six months to find a new job," Petino charged.

The computer operators decided that "if such an action could take place our jobs are in jeopardy," Petino stated.

There was no order to fire the three operators, according to Benjamin. "Nothing could be further from the truth." There had been a mistake and "I know everybody was concerned about it because it required a considerable amount of rerunning," Benjamin said. Somebody was asked to investigate but this did not result in any order to fire, he said.

While the acting operations manager was transferred, this was due to a "philosophical difference between a guy and his boss," and the philosophical difference did not involve firing the three operators.

### Jobs at Stake?

"I can't really understand the motive for the strike, Benjamin said, but suggested that the operators are really concerned about Blue Cross's plans to shift from a shop emphasizing Honeywell equipment to IBM equipment. The operators may feel the IBM equipment will require less operators and that their jobs are at stake, Benjamin said, but again, "Nothing could be further from the truth."

The installation has always been a dual shop, he said, and presently has two Honeywell 8200s, two Honeywell 2200s and two IBM 360/30s. Some of the HIS equipment will remain because it is purchased, other units will stay because conversion would be too difficult, he said.

"This means that for at least the foreseeable future – three to five years – we will be in this conversion process and will have more equipment than we've ever had before," he said.

"By the time we get out of this conversion process, . . . the volume of our normal transactions and new things that have happened will probably require a great deal more people than we have today," Benjamin stressed.

### 'Not Our Worry'

Petino downplayed this issue and said that was really not worrying the operators. Of the 88 operators in the Blue Cross installation, 86 went on strike.

The transfer of the acting operations manager occurred on Friday, Jan. 4, and the operators met the following Sunday to discuss their grievances, Petino stated.

On Monday morning they applied for IBEW membership, he said, with the operations manager's case being the catalyst for the action, he said.

Later Monday, strikers brought IBEW Local #3's business manager Thomas VanArsdale with them to a meeting with Blue Cross President Edwin Werner and Benjamin.

Werner, however, refused to discuss the operator's grievances in the presence of the union representative, Petino said.

Management's viewpoint, according to Benjamin, "is that we did meet and Werner indicated he'd be delighted to talk to people if they have problems," but the computer operators "have put themselves in a position where they will not [talk] without the union representative being there, . . . but if we allow that to happen before the regular legal process takes place," essentially *de facto* recognition would occur, "and we can't do that."

Benjamin said he had "no idea" how long the strike will continue.

It will continue until "Werner decides to meet with myself and members of our committee and a representative of Local #3," Petino stated.

# Conn. Halts Illegal NCIC Access

HARTFORD, Conn. – Connecticut State Police have stopped giving defense contractors arrest record information on employees, a few days after a complaint was filed by the Connecticut Civil Liberties Union (CCLU). CCLU claimed the practice "causes serious civil liberties problems and violates state law."

Laws require the state police to release the NCIC information only to the courts, the state's probation officers and other law enforcement agencies, according to Helen Lech, administrative director of CCLU. A state police spokesman said the department "has suspended releasing any information to others than those who are required to have it by statute."

State police said the practice of releasing criminal arrest information to defense contractors, such as the Electric Boat Division of General Dynamics Corp. and United Aircraft, began under previous administrations and continued repeatedly until CCLU sent a letter to State Police Commissioner Cleveland B. Fuessenich. Trooper Harry K. Bordsden, department spokesman, said the practice was unnoticed by the administration until the letter was received. "We do concur with them that it is a discriminatory practice," he said.

# Infonational to Run Equity DP Operations

*(Continued from Page 1)*

A federal judge here approved the arrangement for Equity Funding, which is now in Chapter X bankruptcy.

Infonational will provide the DP services Equity needs for a monthly fee, which was not disclosed.

One of the reasons given for Equity's decision was the attrition of the staff and difficulty recruiting good personnel.

Equity, which once had an IBM 370/145 and 83 DP employees, has been using only part of a 360/40 for its own operations and those of the auditors who are still investigating the firm's operations. The personnel is down to 27.

Gary McMullen, president of Infonational, said his company's service bureau operations in Los Angeles will be shifted to facilities at Century City that Equity no longer uses.

Its data center operations and Equity's will be combined on an IBM 360/40

Equity Funding has been accused of rigging its computers to inflate assets and create more than $2 billion worth of phony insurance policies which were then sold to other insurance companies.

Three former members of the DP department were among 22 persons indicted in connection with the scandal.

# Next time that uncertified tape wipes out a big processing job, here's a note to your son:

Dear David -
It looks like our camping trip is going to have to wait a month or so. Some work that already had been done has to be done over again. So I'm stuck at the office the whole weekend.

If you decide to get into data processing when you grow up, take my advice, don't settle for anything less than Epoch 4. For only 6¢ a month per reel, you'll be able to spend weekends with your family.

Dad

P.S. Stay out of the magazines in my closet.

GRAHAM MAGNETICS
Graham, Texas 76046

# TRW System Handles New Accounts

By Toni Wiseman
Of the CW Staff

NEW YORK – Credit management has been a headache in department stores for a long time, but the remedy may lie in the development of automated systems.

TRW Data Systems' New Account Processing System, introduced at the NRMA Convention here last week, automates the process of opening a new account without any loss of control by the credit department, according to a company spokesman.

The New Account Processing application data can be manually entered into a TRW System 4000 retail communication network, or read automatically by the preproduction prototype of the new microprocessor introduced at the show.

The intelligent microprocessor interfaces and is compatible with TRW's existing communications System 2000 and System 4000. TRW stressed the compatibility of its equipment with terminals manufactured by NCR, Singer, Unitote, Pitney Bowes and Regitel.

The processor could be sold by midyear, the spokesman said, and will eliminate many manual and repetitive steps, reduce the elapsed time to process an application and the labor for the entire process.

Point scoring is one technique utilized by some retailers to evaluate aspects of a customer's credit and paying habits. Generally a checkbox questionnaire is used, with questions relating to salary, address, marital status, etc.

Now, this stand-alone system automates the point-scoring process because the computer seeks data which can only be provided with a "yes" or "no" or a number. The data contained on the application is captured and displayed on a CRT display.

**NRMA in N.Y.**

A store has two options, according to the TRW spokesman. If it has a point-scoring algorithm, it is included in the software and the decision is automatically made to approve or deny the credit application or ask for further information.

On the other hand, the system does not require that a store use point scoring. If the present credit system is based on an evaluation by a credit manager, he can still continue in this manner by using the information on the CRT.

IBM demonstrates ticket-marking portion of its retail store 3650 system.

# NRMA Gives the OK to POS Systems

(Continued from Page 1)

And interactivity and versatility were the magic words on most vendors' lips.

Vendors cited a trend toward minis because, as Gary McDonough of General Instrument's Unitote division noted, "the smaller installations can finally justify the cost of a mini." An average installation would cost about $3,000/terminal, he said.

Also stressed was the conviction that systems should be interactive, but individual units must have stand-alone intelligent capabilities in case of CPU downtime.

An industry source said he had anticipated the showing of new wands, capable of reading both the Universal Product Code (UPC) and OCR-A, which recently were endorsed by NRMA. None was shown. In fact, many of the vendor representatives were unsure of just what UPC is or that it had been officially endorsed.

The NRMA show was IBM's first opportunity to display its 3650 Retail Store System to a large group of potential users.

The system includes the 3653 POS terminal, with an optional magnetic tape reader; a 3275 Display Station/Model 3; an interactive CRT with keyboard and printer options a 3657 ticket unit; and a 3651 store controller, the controlling linking POS operation, store management operations and the host processor, a System 370.

One of the few new products on display was Regitel's Minipoint System, an open-ended network of electronic POS terminals, which captures transaction data and delivers credit authorization at a cost of approximately $750 per terminal, "depending on the backroom setup," according to a company spokesman.

The retailing philosophy behind the new system is an entirely new configuration, using the Minipoint terminals as satellites of a standard-size Regitel Model 2 register, he said. The centrally located Regitel produces saleschecks from up to six Minipoint terminals.

Minipoint can employ Regitel's Regiscan handheld automatic read of Kimball print-punch merchandise tickets.

Aside from previously introduced POS equipment, Singer displayed for the first time the 1500 Intelligent Terminal System. The heart of the system, the 1501 Workstation, is a desktop system which includes keypunch or typewriter keyboard, solid-state electronics, 8K of semiconductor memory, dual drives and CRT displays of up to 256 characters.

CW Photos by V.J. Farmer
Regitel Minipoint terminal is one-eighth the size of other POS terminals.

The system can be used for data capture, as a printer controller, or as an intelligent communications terminal, by loading a 2 inch by 2 inch cartridge of magnetic tape.

A 1501 terminal with CRT, 8K memory, printer and communications would sell for $15,250, according to a Singer spokesman.

"Tag reading is not really in popular demand yet," Unitote's McDonough said, "but people definitely want to get out of the punch environment."

Vendors all had wands, but each differed slightly with no clear percentage leaning toward either optical scanning or magnetic reading.

An added feature of the IBM system, according to a company spokesman, is the fact that the same wand reader will read credit cards and employee badges with magnetic strips containing credit or employee number.

Singer equipment will read either magnetic tape or Kimball tags. Commenting on the lack of an OCR reader, a company spokeswoman said: "UPC won't be ready until 1975 and even then it will be several years before general merchandising goes into it. Supermarkets have the most to gain."

Singer, however, is currently testing a supermarket POS system prototype which will have a UPC reader, she admitted.

NCR was exhibiting its two POS systems, the stand-alone intelligent terminal with data collector for small installations, and the larger Model 280. Looking for advances in systems for 1974, Jess Perez of NCR said he expected the cassette data collectors would be pollable some time this year.

The NCR wand reader is keyed to color bar code use, however, Perez anticipated a UPC slot reader to be added to the company's supermarket model in the near future.

Pitney-Bowes, though no longer actively in the POS market since dissolution of its partnership with Alpex Corp., showed two related systems.

The company demonstrated equipment that, according to Don Barry of the Stamford, Conn., office, is compatible with the OCR code advocated by the NRMA, with the grocery industry's UPC and with the company's own linear bar code, Codabar. He did, however, say the same wand could not be used for both OCR and magnetic applications.

A Pitney-Bowes subsidiary, Monarch Marking, displayed a batch reading system, which automatically reads information encoded on Codabar-marked merchandise tags. Monarch also showed three systems for tag printing – a computer line printer, a rotary mat printer and a dial printer for in-store use.

There was perhaps less emphasis on DP at this show then at the conference held last September; certainly the sessions were less DP-oriented than those sponsored by the information systems group of NRMA.

# Switch to SSN Ires Mr. Smith

(Continued from Page 1)

guy could get inundated with bills if he chooses a quarterly option for his auto policy, six-month billing for homeowners and has another policy – we could conceivably send him eight or nine bills a year. We needed one common base to be able to tie this back into an account," he said.

He also noted that most people don't know their insurance policy numbers when making a claim, whereas many people do know their SSNs. "Ninety-nine percent of our customers give the SSN because we explain why we need it. Some customers are very pleased now because they know their SSNs offhand."

Smith, in a letter of protest to his local Travelers agent, cited the recommendations of the Department of Health, Education and Welfare's Committee on Privacy of Information in Personal Data Systems, put forth in July 1973, which stated:

- Uses of the SSN should be limited to those necessary for carrying out requirements imposed by the Federal Government.
- Legislation should be passed giving individuals the right to refuse to disclose their Social Security numbers to anyone who does not have specific federal authority to request it, and further, to provide redress if lawful refusal to disclose a SSN results in denial of any benefits.

Zgoda claimed that, if the SSN is not used, an alternative is necessary "which is a lot more difficult to administer. If we were forced to reconvert all our numbers, it would be a massive undertaking." He said the Social Security Administration approved Travelers' use of the SSNs "provided we didn't make all this information available or use it in any way other than pure servicing."

As assurances that Travelers is not abusing information, Zgoda pointed out:

- "We as a company don't make any listings available to anyone.
- "We don't use our computer records to solicit any kinds of insurance at all.
- "In the investigation of a risk we don't even get what we call moral hazard information.
- "It would be virtually impossible to run a tabulated listing off our computer files."

Zgoda said it is far easier to assign numbers but a lot more difficult to maintain them and assure uniform numbers for all the policies of one customer. He said the customer will ultimately benefit in the end with "favorable expense advantages."

The only protest raised at decision-making time, Zgoda said, was that of the cost of getting the data originally. "You have to modify all your forms to ask that question and you need specific mailers to go out to existing customers. It's a very expensive procedure, running into millions," he said.

He had no comment on the privacy issue.

Smith continues to fight for his right to privacy, but not without some problems. In the case of a department store credit application, "quite a fuss" was raised when the SSN was withheld. The State of California uses the SSN as an identifier on driver's licenses. In this case Smith's refusal to give it was accepted, but not without "very sarcastic remarks."

There is one place, though, where Smith has been forced to back down, in his own self-interest. "The University of California insists on having the SSN before giving credit for any courses," he said.

"If I or some member of my family wants credit for courses," he related, "it just isn't worth essentially taking the chance of having to spend years in the courts before you get the credit. In insurance, one can always go to other insurance companies. One cannot go to another university at the same price."

# Dust Darkens Wall Street Computer

NEW YORK – A recent power failure on Wall Street temporarily shut down computers at Securities Industry Automation Corp. (Siac), the joint Big Board-Amex unit that operates electronic equipment for the New York and American stock exchanges. The breakdown didn't affect validity of customer trades made through brokers, but rather delayed intra-broker resolution of certain transaction data, according to Robert Hall, Siac president.

Hall said the power failure was triggered by a computer's smoke detector that was set off by dust. The smoke detector activated a safety device that cut off all power to the computers.

The affected data is connected with the clearing process, part of brokers' transactions with each other. The exchange computers "net out" brokers' purchases and sales, so that a broker need only deliver to another the excess of securities he sold over those he bought.

Those trades that aren't netted out – called uncompared trades – require further research by brokers, and in some cases this must be done on the trading floor.

Normally, Siac delivers reports of uncompared trades so that work on the trades that must be researched on the floor can be begun two days after the trade took place. It was reports of those trades, among other items, that were delayed one day by the shutdown.

# POS 'No Gamble' for User Who Knows What He Wants

NEW YORK – In 1965, retailers knew what computer systems they wanted and needed, and were well prepared for it, but the equipment people only knew what they wanted to sell and scarcely had an ear for what their potential customers needed, according to Frank Burnside, president of Fowler, Dick & Walker.

Addressing the National Retail Merchants Association's annual convention, on "Point-of-Sale – A Tool Against Complexity," Burnside described the system his department store chain implemented after eight years of confrontations with vendors some of which "had delivery or software or service support problems, or all three."

Brushing aside consultants' opinions that it was premature, if not unwise, to make the investment in magnetics in view of the trend in thinking toward optics, the company contracted with Sweda International for 140 model 720 interactive terminals with Datapen magnetic reading capacity.

"Simultaneously," Burnside said, "we awarded contracts to other Litton subsidiaries for Kimball magnetic marking equipment and M&M magnetic customer verification for sends and a special combination form for C.O.D. and layaway transactions. All credit vouchers and payment receipts are terminal-generated tape."

With 80 terminals up and running, Burnside noted the transition experience could not have been smoother.

"For us, the much heralded gamble was not a gamble at all," he stated, "because we were ready and knew what we wanted and Sweda and Kimball were ready, willing and able to deliver it.

"We are not unduly impressed by the Systems Specification Committee opting for an optical font standard," he commented. "If optics were so superior, it is hardly likely that the major national credit cards and airlines would be using magnetics for localized customer identification, or that IBM would have magnetized Delta Distance for its retail applications."

## *NRMA in N.Y.*

identification cards, thereby acquiring an umbrella of related if not totally uniform responsibility."

The reactions of the unsuccessful bidders, he noted, ranged from "outright disbelief and suggestions concerning the state of our mental health, through offers of a better deal and proffers of assistance when the crash came, to sincere expressions of sympathy."

In 12 weeks, he said, a team of company systems and training people and a team from Sweda produced "a very simple, extremely sophisticated point-of-sale collection system."

The system, he explained, handles 300-odd different types of transactions, including returns, credits and exchanges. It also provides for some 15 to 20 other functions, including collections on utility accounts. Additions to stock and inventory detail are read into any terminal.

"The only paper in the system," he said, "in addition to the terminal receipt, is an address label inserted for machine


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## Report Says More Widespread Use Coming

# Multinational Data Banks Require Special Safeguards

By E. Drake Lundell Jr.
Of the CW Staff

MONTVALE, N.J. – As multinational data banks become more common, "new institutions will be required at the multinational level to resolve disputes over the transmission of data across national boundaries," according to a recent publication from the American Federation of Information Processing Societies (Afips) here.

In addition, the publication said these new institutions would have "to develop regulations concerning the activities of multinational data banks, to provide individual safeguards, and to deal with problems of standardization of data transmission facilities and capabilities."

The publication, written by Burt Nanus of the University of Southern California, Leland M. Wooten of Southern Methodist University and Harold Borko of the University of California at Los Angeles, is based on the admittedly imperfect Delphi technique, but represents, the authors said, a first attempt at coming to grips with the problems likely to be raised by multinational computers and data bases.

### Time Is Coming

"The use of computers in this manner at the present time is certainly not widespread," the authors admitted. "However, as one projects ahead 10 to 20 years and contemplates, on the one hand, the rising tide of multinationalism in both corporations and governmental organizations, and, on the other hand, the rapid increase in capabilities and decrease in cost of computer/communications networks, one can conjecture it is only a matter of time (and probably not very much time) when these kinds of applications will proliferate."

Within the next 10 years there will be some major multinational networks in existence, the group predicted, but added the nature of the impact of such development is "still only vaguely perceived.

"On the technical side, there appear to be few barriers to the development of these systems that are not now already close to solution," the report noted.

"The problems that do exist are more in the nature of political or socio-cultural," the report added, indicating the most profound effects of these systems will be on this level.

### Multinational Decisions

"Within the highly industrialized societies, many people will find themselves in some form of man-machine relationship, often involving multinational communications, within the next decade," the authors predicted, which might lead to situations where "individuals will be asked to make decisions in a multinational context that may not be consistent with the policies of their own governments."

At the same time the group predicted that while in the short run the use of multinational computers might tend to enhance the prospects of the "information-rich, wealthier nations at the expense of the information-poor," in the long run the use of such systems will increase the "technological options" open to the lesser-developed countries and "speed their ability to industrialize and to take advantage of the latest developments in education, management, medicine or public administration.

"The danger to the developing nations is that the MNCs (multinational computers) may distort their investment priorities or lead to policies that favor multinational as opposed to national patterns of socio-economic change," the group said.

### Delphi Technique

The Delphi technique polls a selected group of people – in this case from several different disciplines, with a series of questionnaires, each succeeding one based on the previous and developed in order to refine the opinions expressed there.

In this group it was found that 50% of the people (all of whom were familiar with computers) felt that multinational computer systems would help "to enhance the power of multinational organizations whose interests transcend national interests and which are generally the creatures of the industrial nations.

In all, 83% felt the use of computers across national boundaries "will contribute to homogenization of cultural values and attitudes," and 60% agreed "the use of computers across national boundaries contradicts the present trend to put 'people' ahead of things."

In all, 83% of the group agreed that political considerations were the most important barrier to the growth of multinational computer systems and 59% said the lack of political or legal mechanisms to determine who controls such data banks was the most important political consideration.

### Minor Barrier

However, 56% indicated the refusal of nations to lower restrictions on the trade of computers was a relatively unimportant barrier to the growth of multinational systems.

Afips also outlined five areas where future policy is necessary:

- "It is likely that the right to individual privacy vis-a-vis the use of various forms of information technology will have to be defined in terms that provide safeguards to individuals in different cultures. That is, the cultural determinants of this right must be transcended in order to adequately protect the right of privacy at the global level.
- "Organizations and nations will need a common understanding regarding the fraudulent uses of data by multinational organizations. Protection against these fraudulent uses of data must be safeguarded at the global level.
- "Nation-states are likely to begin to formulate policies that enlarge the public arena of control over the use of MNCs.
- "Multinational organizations will need to formulate policies regarding the access to information contained in multinational data banks and information systems.
- "Multinational organizations and nation-states will need to agree on policies strengthening the position of the LDCs (lesser-developed countries) in all arenas where the use of MNCs is prevalent."

# Danger Lies in Natural Mishaps

**DP security is a complex, interactive mix of physical, procedural and data protection, with a healthy amount of backup and audit.**

**The first two parts of this series gave an overall look at the security responsibilities of both users and vendors, while this and future parts analyze in detail the threat to security and protective measures to minimize security risks.**

Much activity and public concern has been raised over the problem of data disclosure and invasions of privacy. The recent HEW report called for a mix of legislation and technical safeguards in computer systems to protect the rights of the individual.

**Peter Browne On Security**

Some of the mechanisms for the development of those safeguards stem from computer security programs. However, computer security in its broad sense deals with computer system risk management, not just problems related to disclosure. It attempts to rationalize and protect against threats to data.

The key element is not the system, but the data within. There are basically six bad things that can happen to data: accidental or intentional disclosure, modification or destruction.

From a threat viewpoint, there are some well-defined actions that can cause these six bad results. They can be classified into threats related to mistakes, natural hazards, utility unreliability, personnel actions (disgruntled or dishonest people) and miscellaneous threats.

It is significant to note that accidental destruction, modification or disclosure of data is far more common than intentional destruction, modification or disclosure. However, intentional happenings are more costly.

***Part III***
***Accidental Threats***

Data is destroyed every day, most commonly by programmer or operator error. A simple dropping of a disk pack or the erasure of a volume table of contents causes reruns, a necessity to go to backup data and confusion in the computer room.

The same confusion results from accidental modification of data. This is why programs generally have extensive and very comprehensive checkpoints whenever they process.

Disasters "always occur to someone else," but statistics show that a number of computer centers do get burned or flooded each year. The stories in *Computerworld* after hurricane Agnes should be enough to goad DP managers into considering their vulnerability to flood, wind, hail, storm or fire.

In an environment of energy shortages, blackouts, brownouts and uncertainty regarding capability of electrical utilities to supply smooth, transient-free power, the problem of insuring against utility failures takes on increasing importance. A few milliseconds of 10% power fluctuation can cause not only a temporary interruption of computer processing, but inherent damage to the electronic circuitry which may result in delayed equipment failure.

The Equity Funding debacle has highlighted the concern over computerized fraud, or computer abuse as Donn Parker of Stanford Research would call it. Each week, one can read another story about someone who utilized the computer for his own nefarious end and got away with it. Generally, these people get caught by controls not related to data processing or DP security.

All of this illustrates merely the fact that the first step in developing computer security must be to recognize that there is a problem. More to the point, once a problem is recognized, the user should see that the responsibility for computer security must be set, and that the development of such a program will help reduce the risks facing data processing.

It should also be recognized that although accidental threats are more common, the intentional ones happen more often than one expects. The answer to controlling these threats is to install some kind of cost-effective protection that will reduce them.

*Part IV will examine some of the general protective measures that can be taken to guard against these security threats.*

*Peter Browne is superintendent, DP Executive Office, State Farm Mutual Automobile Insurance Co., Bloomington, Ill.*

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# VA Check Delay Laid to Programming

CW West Coast Bureau

LOS ANGELES – Delays in veterans benefits which were blamed first on massive computer foulups and then on administrative incompetence are being investigated here.

U.S. Sen. Alan Cranston (D-Calif.) has accused high-ranking regional Veterans Administration officials of "apparent administrative incompetence" for the delays.

He said he will hold public hearings into delays (reportedly up to five months) in payment of monthly subsistence checks to veterans attending college.

Cranston said a check with the VA in Washington revealed no comparable problem in any of the VA's other 56 regional offices.

A front-page article in the *Los Angeles Times* described the delays for "hundreds" of Southern California veterans and quoted a VA official as saying it was "a problem caused by machine and not by our employees."

The *Times* described the problem as one caused by a "massive foulup in Veterans Administration computers."

A VA official in Los Angeles contacted by *Computerworld* attributed the delays to multiple factors, one of which was a new procedure for advance payment, "which was not programmed too well."

He denied machine difficulties but acknowledged "programming deficiencies."

James F. Chestnut, director of the VA data processing center at Hines, Ill., which issues educational benefit checks to veterans throughout the world, exculpated the computer system.

"The system is performing in the manner in which it was designed to perform," he said. "If there is a shortcoming in the system, we are not aware of it."

The system has two IBM 360/65s, each with 1.5M bytes of core.

## Adcom Board to Work With City

LOS ANGELES – A five-man committee has been named by the Association for Data Center Owners and Managers (Adcom) as part of its effort at self-policing to conserve energy.

David Coriaty, president of Adcom, said the committee will work with the special city ad hoc energy committee during the implementation of city ordinances to reduce power consumption.

The city is asking commercial users to reduce power by 20% in a first phase effective Jan. 5, and 33% in phase two beginning Jan. 15, if necessary.

Adcom, he said, will screen members who cannot comply and represent them at hearings planned by the city.

Coriaty said Adcom is also trying to get its members named to some of the hearing committees that will decide on variances for those who cannot comply.

Adcom members were "heartened," Coriaty said, by the decision of the city to make a percentage power cut rather than impose a 50-hour work week.

## If Not Best Man, Maybe Best CPU

LIVONIA, Mich. – Charlie the computer did everything except cry at this wedding.

Charlie, a real estate firm's name for its IBM 360, computerized the invitations for the ceremony uniting two company employees.

And since the wedding was performed in a conference room of Realtron (the company), "Charlie" was able to "survey" the proceedings, sources related. In fact, he had the last word.

With "his" audio response unit programmed for the occasion and plugged in over a telephone speaker, Charlie delivered a toastmaster-style speech: "Computer to address group now present Nov. 21, 7 p.m. Realtron group present to see license contract properly confirmed. Status is now not bachelor. Immediate magic improvement. You two are one. Female now private property. Future prospect is security. Status now not taxable."

After the ceremony, "Charlie" went back to work using "his" 256-word vocabulary to transmit real estate data across the nation.

## Recycling Is Beautiful

OMAHA, Neb. – You have to get up pretty early in the morning to keep up with the Keep Omaha Beautiful recycling program. Some employees are reporting to work at 5 a.m. to pick up and process the growing amounts of used computer paper, tab cards, old records and other business paper that was once destined for landfill.

Since September of 1972 the amount of business paper recycled has grown to 125 tons per month.


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## GENERAL AUTOMATION

## *Editorial*

# *A Giant Step Backwards*

In typical fashion, the government is speaking out of two sides of its mouth, this time regarding the implementation of the HEW privacy committee's recommendations.

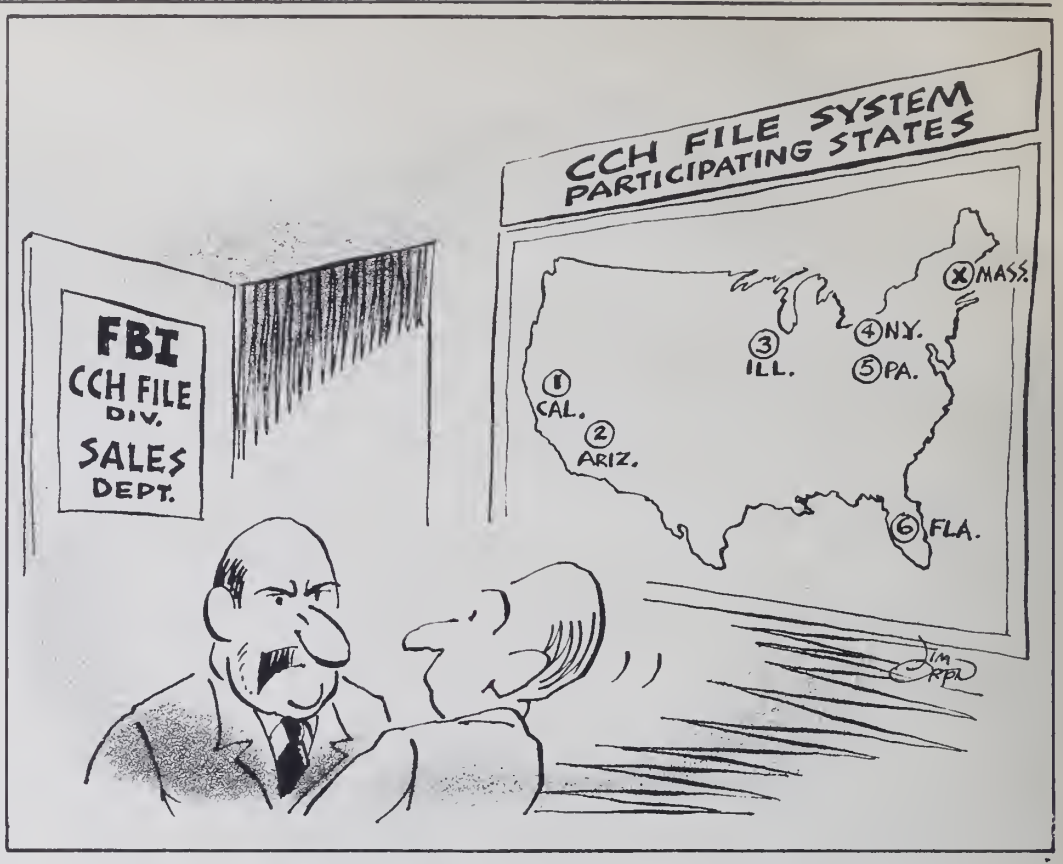
Last summer, Elliot Richardson and Caspar Weinberger endorsed the committee's report, which included a recommendation that the use of Social Security Numbers (SSN) be prohibited except for those uses mandated by federal law.

But the Social Security Administration has approved an insurance company's request to enumerate all policies with the SSN, instead of using separate policy identification numbers (See Page 1).

Using the SSN could cause confusion in administering records for individuals with several different policies. But even more serious is the disregard for the HEW report and for the possible dangers to privacy.

The government approved the insurance company's request after a promise that information on policyholders would not become generally available or used "in any way other than pure servicing."

But we all should have learned by now that the protection of individual rights is based on prevention of danger, rather than on *post facto* apologies.




**'Ten New States This Year or It's Back to the Fingerprint Files!'**

# *Letters to the Editor*

## Polemics Are Poison

Your organization obviously has the right and duty to run your operation as you think best – within certain legal limits. I regularly use *Computerworld* to keep in touch with what's happening, and to contact many of your advertisers. Occasionally you carry some stuff that bugs me, but overall you do a good job for my purposes – But now you pick up this boy Grosch!

I know practically nothing about him, except by word-of-mouth reputation (which doesn't inspire admiration). Two of his efforts in the Nov. 28 issue, however, are disquieting to me. One, his "footnote" in Letters to the Editor, seems to encourage radical mail, belittle conservatives (neither of which fits me), and brag about the power of the press.

Are you familiar with a magazine called something like *Computers and Automation*, that spends most of its paper and ink on non-computer left wing diatribes? Don't go that route! There are places for stump speeches on politics, ecology, etc. – but why in CW?

The other irritant, of course, is the box entitled "A Carnival of Greed." Most little old ladies or school kids know more of the facts and implications of the energy crisis than HG exhibits in this bit! It's ridiculously misinforming, misleading, and all that – as CW must certainly know.

No one, as I understand it, has ever gotten old HG to plug into the real world.

If HG hasn't somehow blackmailed you into an ironclad contract, I'd suggest you give some thought to the real and useful purpose CW serves – and see if HG *really* contributes to it. To my mind, he certainly doesn't, based on performance so far!

Paul P. Entrikin

Baton Rouge, La.

## A Request to Herb Grosch

I have been a reader and occasional contributor to *Computerworld* for four years. During this time CW has changed in many respects, mainly for the better. However, one change is now needed which appears to be of benefit to CW's readers and to the profession. This change involves you, Herb Grosch. It also involves others who would write in a similar fashion.

Please present your published comments in a more professional manner. You have made (or have attempted to communicate) a number of very important points. Why degrade your presentations, obscure your meanings, or make unnecessarily trite and jargon-laden statements to state your case?

To what type of an audience are you addressing your remarks? What kind of an example do you (a knowledgeable industry spokesman) set when you write: [CW, Nov. 14] "Old Bull Elephant Norris . . . suckling peacefully on the military-industrial teat, the poor natives . . ., Bwana DOD, . . . slightly polluted Caspian caviar," etc?

Also, your readers (mostly intelligent ones, too!) will not understand many of your unexplained and unnecessary references, abbreviations and acronymns.

I submit that your articles can be written in a non-sterile, dynamic, robust and extremely effective manner and at the same time convey a more professional image. Articles written in the manner you have chosen degrade the quality of CW and tend to discredit our profession. Please don't ignore or simply write a rebuttal to my statements above.

You appear to be a knowledgeable person in the data processing field. You *can* be a more effective spokesman. Please take my remarks in the sincere manner in which they are intended.

William L. Thomson, CDP, MBA, CPA

Jacksonville, Fla.

**I do, Mr. Thomson, and I understand your concern. I get similar private suggestions from old friends such as Tony Ralson, unpublishable diatribes from Birchites, and complaints from the CW staff about "retiarius" and "must." Style is certainly important, and I myself can hardly read Norman Mailer because his viewpoints and writing technique disturb me so much.**

**But still, I have to reject your request. The style you dislike, the style which weakens my persuasiveness for you, has been an integral part of my speaking and writing since elementary school. I consciously try to be personal, pungent, provocative in my talks, my columns, my miscellaneous comments and letters and interviews. It is decades too late for me to change, and I wouldn't if I could! HG**

# Specify Your Tomorrows

In our trade, the future roars down upon us like an out-of-control missile. Users, manufacturers, even the older R&D types bravely but apprehensively go about their chores like Londoners under the blitz. Some awfulnesses we can anticipate, as Londoners could hear the buzz-bombs in the distance: the 1976 announcements, networked minis, more complex ("improved") software. Others arrive unexpectedly, like V-2s: supersonic disasters. One thinks of unbundling and of virtual storage; neither was new as an idea, each was announced unexpectedly. So for me personally was the System/3; there I was at the center of the federal DP standards effort, and crash! The most anti-standard system in computer history landed on my head.

One of the promises of futurism, of professional prophecy, is to hear V-1s a long way off, to predict at least the capabilities and approximate arrival times of information ballistic missiles. I don't propose in today's column to predict any particular trend or artifact, but to advocate a particular technique of forecasting.

The two common types of planning professionals use are trend analysis and scenario writing. In the first and oldest, we plot the number of Benelux computer installations for each year, look at the droop of a similar curve for nearby but earlier areas (France, Britain), add in the economic projections for the Low Countries made by others – banks, Common Market economists, the Department of Commerce people – and draw a dotted line up to 1975 or 1980 or whatever. Or we do something similar for impact printer speeds, or demand for bank teller terminals.

Whether we enjoy the process or not depends on degree of commitment: a professor in a B-school thrives on it, an economist or security analyst is nervous, especially today. A young entrepreneur, a production planner, a department store buyer hates it, and rightly so. His or her personal reputation and financial future depend on projection; it *has* to be done – avoidance is impossible; the process is notoriously unreliable.

As an alternative, as a cross-check, and as a more entertaining and spectacular method, there is the Rand/Herman Kahn/scenario approach. After suitable private spasms (and boning up on all the available subsystem trend projections), the prophet outlines future requirements: people will bank from their home phone, manufacturers will assemble all their card readers in Taiwan, air travel will decline and Amtrak will flourish. Then the consequences of the scenario in sales, capital requirements, per-bit memory costs are, you should pardon the expression, calculated. Just as wobbly as the old method, but a lot more glamorous.

For the DP user community, both methods are invoked daily. I have another idea, and I expressed it first at a futurist meeting at the Bureau of Standards in early 1970: *specify* the future. To go back to my London analogy, say as Churchill did, "We will never surrender!" Then make it come true. Don't ride the trend lines, don't accept the scenario. The Fords and Watsons and the Edward Lands do it; in our own bailiwick, John Backus and Jack Jones did it.

If we want a 380, or truly standard Cobol, or a data satellite, we can make it happen. User groups, professional societies, imaginative suppliers, *Computerworld* can be vehicles for the future the community wants – or just victims of the trends, the scenarios promulgated by others. A great New Year's resolution for every reader would be: Demand the DP future you want!

Herb Grosch

# Letters to the Editor

## Government Intervention— Good or Bad for Industry?

There is a simple reason why questions "somewhat removed" from the law and court process begin to surface in the IBM antitrust case. The antitrust laws are bad laws that punish or threaten to punish unjustly.

If Judge A. Sherman Christensen says IBM has broken the antitrust laws, then by definition it has. This is because the antitrust laws call for subjective application of economic "principles" rather than objective weighing of facts. The determination of what constitutes a crime is not written into the law, it requires the creative act of a bureaucrat.

Indeed, Christensen could choose to find *any* business in violation of the antitrust laws. If the firm charges less than its competitors, it is trying to "restrain" trade by forcing them out of business.

If the firm charges more than its competitors, it is exercising "monopolistic" power over a differentiated product. If the firm charges the same as its competitors, it is guilty of "collusion." (If this rhetoric seems academic, consider the plight of the General Electric executives jailed for "collusion.")

In short, the antitrust laws are non-objective laws whose required subjective interpretation makes them *ex post facto* laws and leads us from "a government of laws" to a "government of men." The Justice Department itself admits this, when, as is often the case, it grants approval to a merger while reserving the right to change its mind in the future.

It is impossible for any businessman to predict whether a business decision violates the antitrust law, i.e., is a crime. Does the Mafia thug have the same difficulty while parked outside the "plate glass front"? To compare IBM with the Mafia is an act of irresponsible journalism. The type of thinking it represents must be checked by clearer ideas if our freedom is to survive.

If *Computerworld* wants to go on a monopoly-country safari, let it attack Ma Bell and her government friends. She is a true monopoly, a firm whose power over the marketplace derives from force, legalized government force.

IBM has made life difficult for some in our industry; others have found their niche and prospered. That many firms in the "million-dollar-machine marketplace" feel obliged to plead for "IBM monopoly relief" does not mean all must. Indeed, I learn from CW that there is one, at least, such firm that is not. (To me, that says all there is to say about the relative quality of IBM's competitors.)

But what about MCI and Packet Communications? Can they do anything without a lot of bootlicking of government officials?

All those who wish to ignore the more important moral issues discussed above should ponder the practical question, "Will the computer industry really benefit from more government intervention?" Consider the prime example of a regulated industry: the railroads.

Anthony G. Lauck
Wellesley, Mass.

## Let the WHAT System Work?

I would think such avid students of economics as Ira Cotton, John Xenakis, L. Saunders, et al [CW, Letters to the Editor, Dec. 19], if they refer to the law of supply-demand-price as "The System," should know that this system is inoperative in this age of unchecked vertical integration, conglomeration and interlocking directorates. The real name of the game is Beat the System.

Both Cotton and Xenakis ignore completely the human psyche, as much a science as economics. One gentleman's reference to "1000 conspirators" as an improbability is naive to the utmost. As Dr. Grosch suggested in response, the system itself, as practiced, is a conspiracy. And after all, Xenakis, what do those gentlemen habitues of the Pacific Union Club, and similar "Bowser Clubs" across the land, *really talk about?* It doesn't require an overt conspiracy, just a sort of *polarity*, the kind that results when good friends get together.

As for Cotton's textbook presentation of the law of supply and demand: this has been replaced by a neat thing called the Retrograde Point of Diminishing Return (Griffins Law). This discovery came about, in part, through the use of eco-simulators, operations research and computer gaming. The nice thing, for the Oily Bunch and other energy producers, is the discovery that by recalculating the point of diminishing return, based on a throwback to, say, a 1950's level of investment (capital, r & d, promotion, etc.), there could be realized a much higher return on investment.

You see, in a gradually upswinging economy with population growth, technological progress, etc. the PDR was always out front, like the carrot on a stick. Perhaps until computer gaming and eco-simulators came along, few realized that in a retroactive way, they might have passed a more attractive PDR without knowing it.

So now the energy industries have a way to make more bucks, without the old commitment to "making it on volume." And in the bargain, they don't have to put up with picky consumers, fickle labor and pointy-head ecologists. In short, they are going to cut a lot of troublemakers down to size. Back to the protestant work ethic, boys!

Tom O'Connor
San Jose, Calif.

## Cheers for Other Guys!

Re page 21, the Dec. 26/Jan. 2 issue:

When you look up in the sky and see Swiss Air, you just have to remember the Swedes are the other guys.

S.A. Sverige
San Jose, Calif.

# U.S. Cobol Tests Give Users Hope for Better Compilers

*(Continued from Page 1)*

A set of continuation tests showed the computer was not accepting legal continuations of literals, or words, when they crossed more than one line.

All these errors, even though they may not be as serious as the compiler-object-time errors noted above, can certainly help a user become locked into a vendor, which is exactly what Cobol is supposed to avoid.

### Operators Given Garbage

Yet another failure for the compiler was in providing incorrect operational instructions to the operators. This ridiculous and dangerous situation was found in the testing of the STOP verb.

Here the Cobol programs allow operator instructions to be given through the use of literals. The IBM ANS compiler created object code that displayed a blank one instead of a quote mark, garbage instead of a zero, and boxed off the last eight characters of a 120-character message!

### Failure of Establishment

I think, however, the really important area of the Navy report is the one which does not so much measure the compiler against the standard, but an area of informational tests. Here the study checks exactly what the compiler does under certain circumstances, and reports it, without giving a PASS or FAIL comment.

This area is important because, while the computer mistakes previously mentioned are certainly serious, they are all problems which can be solved by a single vendor. Tomorrow IBM could issue a Version 3 of its full ANS standard Cobol, and all the related problems could be answered the day after. It could happen, although I am not taking any bets on it.

What has happened here is that the Ansi Cobol specifications themselves have been interpreted in more than one way, so the operation of a standard program will be different when prepared from one compiler, compared with another – and no one can say either of the programs is really incorrect. This is the area that really is stopping Cobol portability – and hurting all Cobol users by effectively depriving them of some of their program investment value.

Not all of the Cobol standard was able to be actually tested by the Navy. The Navy found so many ambiguities in the Report Writer section that it eliminated this whole area from the test!

Even so, several other ambiguous situations were found within the specifications.

### Wasting File Space

One of the problem areas tested dealt with the creation of files by writing multiple-length records – one record with the length of, say, 120 characters, followed by one with a length of 50, etc. The ambiguity here questioned whether the system would inflate the size of the smaller records, so that a fixed-length record system could be used. This would mean wasting 70 characters.

Clearly from a user point of view, it is better for him to be able, when he wants, to keep the size of his files down. However, the Ansi Standard left the matter up in the air. In fact, the IBM compiler turned out, under the testing, to be working properly (from the user point of view) and did produce records of different length. But no one can tell this from the Ansi specification – and other computers may not do so. And how about a file that is going to move from installation to installation?

### Printing Can be Obscured

The default situation in printing a line is another instance. Here printing could occur either before advancing, or after advancing, when a WRITE statement is given. In the IBM case printing happened before advancing. But if the program had been tested on a computer which defaulted to AFTER, then not only could the spacing go wrong but one line would be printed on top of a previous one!

None of the individual problems here is very serious in itself, but each is serious both in the way it has been allowed to occur even though it obviously hurt the movement of Cobol programs from one system to another.

*"It is unlikely, however, that now that Cobol compiler testing has become a reality the vendors will continue to be able to hide their 10 years of failure to make Cobol machine-independent behind the skirts of Codasyl."*

This form of testing proves that the current maintenance system for Cobol is simply not working properly. The failure is because of the operational mode of the vendor-dominated Programming Language Committee of Codasyl, which still, for instance, has not dealt with the first proposal it received in 1968 – but which in April 1973 approved a raft of complex changes in collating sequences – after they had been voted down at the official meeting!

The Codasyl power of procrastination, combined with its power of uncontrolled acceptance, has been simply too powerful up to now to ensure that Cobol is either standard or machine-independent.

One test, for example, (Nucleus 203) produced an object-time result of 99,320. This would look perfectly good in operation – except for the fact that the correct answer was 108,140! Here the subject matter was a compute statement. And this was not the only one either. Other such examples follow:

- An Addition test failed to find the correct answer – apparently because rounding did not take place.
- An Examine test that was supposed to replace all zeros by 9s left a 9 in the result!
- A Subtraction test returned a value of -.090, instead of -100.

The problem is that the computer can actually insert occasionally wrong results into the computation *at object time*. Program testing procedures, now in normal use, rarely attempt to check the internal operation of the compiler verbs themselves. This makes it quite possible for a perfectly good, tested and checked standard Cobol program, which on other compilers and on other releases works perfectly, to suddenly start producing incorrect results without giving any outward indication of problems. No wonder so many users are afraid of moving Cobol programs around.

### Problems Don't Always Compile

But the errors reported in the test are only concerned with compile-time operations. Another set of tests dealt with the compiler's ability to accept correct Ansi Standard Cobol language. Here again the compiler failed on several occasions.

For instance, during a Library test (202) the compiler was instructed to replace a word with a subscribed data name in a COPY statement. It would not.

It also issued a fatal diagnostic when a NOTE content included either a non-numeric literal, or a set of periods, although a programmer needs – and officially has – full freedom to write anything he wants within the NOTE phrase, so as to assist in documentation.

It is unlikely, however, that now that Cobol compiler testing has become a reality the vendors will continue to be able to hide their 10 years of failure to make Cobol machine-independent behind the skirts of Codasyl. New validation reports can by published any day.

Cmdr. Jan Prokop and Dr. Paul Oliver, both of the Navy Automatic Data Processing Equipment Selection Office, who are performing the testing, recently told me when I visited them in Washington they expected to develop tests for the currently developed new Cobol Standard within "about a year" of its approval. That compares with the five years users have waited for the current tests.

That will make the vendors sit up. They will have to take a lot more notice of the tests than they seem to have done of the specifications of the Ansi Standard.

All of this is great news for Cobol users. More strength to the Navy and the National Bureau of Standards which are controlling the tests! They are both doing a real service for Cobol users.

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# Letters to the Editor

## EFTS Revisited: Define, Then Attack

Neither the Nov. 7 article by Ronald A. Frank (summarizing Rep. John Forbes' remarks) nor the Nov. 28 rebuttal by Dale Reistad did much to define EFTS. If the system being attacked (or defended) isn't defined, how can readers be expected to evaluate the attack (or defense)?

EFTS is any method of moving funds from one bank (or other financial institution) account to another by electronic means, rather than by sending paper through a clearing system. Subparts of EFTS are POS (point-of-sale), ACH (Automated Clearing House) and other services.

When the nationwide POS system is installed it will probably have the following characteristics:

- The merchant may effect an on-line transfer of funds from the customer's account (at any participating bank) to the merchant's account (at the bank of the merchant's choice).
- The merchant can elect to honor any national or local bankcard, T&E (Travel & Entertainment, i.e., American Express) card, his own card or any combination of the above.

The merchant will either use his electronic cash registers as terminals or lacking these, will buy or rent a simple terminal device. The terminal will be on-line to a switching center which can switch the message to the appropriate banks (or other institutions) where the funds will be collected from the customer's account and deposited in the merchant's account.

- The consumer has a choice of using a card that will cause an immediate withdrawal from his checking account (a debit card). The customer will have the freedom to carry multiple credit and/or debit cards.

The Automated Clearing House will be able to handle either preauthorized credits or preauthorized debits. Preauthorized credits are nothing more than direct deposit of payroll and other items of income.

There are two distinct kinds of preauthorized debits: authorizations, good *until revoked*, will be used for regular recurring payments, usually for fixed amount obligations like insurance premiums or mortgage payments.

The other is one-time authorizations for single payments only. This is what the Atlanta Payments Project calls "Bill-Check." With "Bill-Check" the customer signs the bill, specifies the amount he wants to pay and mails it back to the vendor as if it were a check. The vendor converts the amount the customer is willing to pay to an "electronic check" and deposits it in his bank which sends it to the customer's bank through the ACH.

Another service sometimes loosely referred to as a part of EFTS is cash dispensing. The customer can get cash from a dispenser without writing a check or signing a draft and have his checking, savings or loan account automatically charged for the withdrawal.

Banks are approaching EFTS very cautiously. Customer options and controls in most cases are increased rather than decreased. (Typically a preauthorized payment can be reversed for any reason by the customer within a reasonable period of time after he receives his statement.)

Customers using EFTS can (and because of personal convenience may tend to) centralize their credit if they desire to do so. But they will be under no obligation or pressure to do so.

N.C. Sizemore
Manager, Long Range
Systems Planning
First & Merchants Corp.
Richmond, Va.

## Insurance Industry Also Has Doubts

I share with Herb Grosch general doubt and disagreement about most of the reassurances offered by Dale L. Reistad [CW, Nov. 28] with respect to electronic fund transfer systems (EFTS). He dismisses by fiat Rep. John R. Forbes' statement that, "In effect banks would be substituting their own credit for that of retailers or other competitors" and "the effective control over credit [by the banks] and the exclusion of non-banking institutions from the EFTS poses serious ramifications for consumers."

The list of possible misuses under EFTS as well as the beginnings of a system that will provide a permanent centralized record of an individual's every financial transaction is written off as confusion on the part of Forbes and his staff. It's possible that they are paranoid about EFTS, but, if so, they are in interesting company.

The Institute of Life Insurance publishes a series of Trend Reports for life insurance executives. In both Trend Report #5 (January 1973) and Trend Report #6 (May 1973) they caution "that if the insurance business does not begin to develop sophisticated inter-company computer communications, the future of all financial services, including insurance, could rest with the banks."

It is not clear that we will be in better hands with the insurance companies. But if a business second only to the banks in importance to the financial life of the U.S., and indeed very heavily interlocked with banking institutions, is concerned, perhaps it should give pause to the lowly consumer.

Bradford Smith
San Luis Obispo, Calif.

# Learning to Cope With Defeat Is Hardest DP Skill

By Miles Benson
Special to Computerworld

One skill they don't teach in computing courses is how to cope with failure.

Once failure has been officially proclaimed, there's still a world out there to be dealt with . . . the people who are concerned about going down with the ship, the people who paid for the ship in the first place and the people who are still waiting for the ship to come in.

Some folks just seem to know intuitively how to do a job right. Some of the people in this story were that kind of people. When this project had fallen on its face, these people picked themselves up, dusted themselves off and began thinking about the uncomfortable tasks still ahead: getting a corporate decision on how to admit to the failure which had occurred, and carrying out that corporate decision.

To these people, there was only one way to do this particular job right.

### Heavy Strategy

But picture the strategy sessions leading up to that corporate decision. Imagine the factions at work, each with its own way of decommitting the failed project.

"Let's convince them we cancelled out in their best interest," says one.

"Let's make it all seem like it wasn't important in the first place," says another.

**The Project That Failed**

"Let's just hit them with a snowstorm so dense they'll never realize until later what really happened," says still another.

"Why not tell the truth?" comes a voice from the back. "Why not just admit that we screwed up, that we tried to do something we didn't really know how to do and that we learned that we still don't know how?"

A gasp goes through the assembled crowd. Use honesty as a tactic? Lie down and let the users walk all over us? Our competitors will laugh us out of the marketplace. We may be sued. Can't we at least *try* to make it look like we knew what we were doing?

Who knows by what process the decision was made? Somehow, merging from those strategy sessions, from that tangle of conflicting factions, came a decision. Honesty, the corporate officers decided as if it were a new concept, was the best policy.

The announcement wasn't quite as auspicious as the company's more positive product announcements had been in the past. They did not hire theaters all across the land. They did not fire a shotgun blast of information at the entire DP world.

The announcement, instead, was fired rifle-fashion at the users who cared, who needed to know. The company sent representatives out to user facilities. They asked to use conference rooms suited to a small group of technically and managerially interested people. And they stood up, and laid it on the line.

Picture yourself in one of those rooms. A vendor's rep has just admitted his company has failed in an important way. He has not only told you that they failed, but how badly. And why.

You've got a lot of instincts going at a time like that. One instinct, rooted in a pantheistic prehistoric past, is to leap on the rep. Go for the jugular. Kill.

But there's another instinct that seems overwhelmingly strong. This guy up there is a human being. He didn't make the mistakes. He's been as honest as possible. He deserves better than to be attacked. He, and his company for sending him here, deserve sympathy and understanding.

The thick new instinctive veneer of the civilized person, who has learned that he is like other human beings and must live on this earth in concert with them, takes over . . . and wins out. The defenseless, honest approach has generated its own defense.

Well, that's the way it happened. The failure announcement was a resounding success. An understanding world liked a company which knew when the time had come to peel back the corporate facade.

Do you suppose there's a lesson there which could be applied not just to projects which fail, but to those which succeed as well?

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## Random Notes

### Metric System Impact Shown In Reference Series Guide

NEENAH, Wis. – A basic guide to the metric measurement system is available in ring-binder form for $59, from J.J. Keller & Associates, Inc.

Revised pages to keep the guide up-to-date are available for an additional $10/quarter year and bulletins with current information related to the conversion to metrics are on sale separately for $5/mo. The guide and supplementary services can be ordered from 145 W. Wisconsin Ave., 54956.

### Data Bases Revisited

WELLESLEY HILLS, Mass. – A second edition of Data Base Management Systems – A Critical and Comparative Analysis is available from QED Information Sciences, Inc., 170 Worcester Road, 02181.

Rewritten in part to clear up ambiguities in the first release [CW, June 6], the 340-page publication is a technical report on the features of four major data base management systems: Software AG's Adabas; IBM's IMS; MRI's System 2000; and Cincom Systems' Total. The $385 price includes a planned update as new features are announced and evaluated.

### 'Calculations' Covers Calculators

BEAVERTON, Ore. – The first issue of a quarterly publication, *Calculations,* produced by Tektronix, Inc., concentrates on statistics, from early history to present day applications.

The new magazine is calculator-oriented, but will also cover application ideas, new products, books and occasionally – as in the introductory issue – history. It will deal, Tektronix said, with the relationship between calculators and software, with each issue based on a particular application area. Free subscriptions can be requested from P.O. Box 500, 97005.

### Improving Your Data System?

ROCKVILLE, Md. – Inappropriate action or inaction may be the cause of problems in DP systems, according to a 14-page brochure entitled "Information Systems Development: the Problem, the Reasons and the Answer," free from Barnett Data Systems, 1010 Rockville Pike, 20852.

### Compu-Serv Talks About Net

COLUMBUS, Ohio – Compu-Serv Network, Inc., national data services firm, has printed a bulletin outlining the company's remote computing and contract programming services.

Copies of the bulletin are available by writing to Compu-Serv Network, Inc., 5000 Arlington Centre Boulevard, 43220.

## Review Takes Planning

# DP Costs Checked by Good Post Audit

By Don Leavitt
Of the CW Staff

PARK RIDGE, Ill. – The word "audit" often makes DP professionals feel threatened, but the "threat" of a post audit of recently completed projects should encourage the DP staff to monitor its own operations more closely, according to systems analyst Christopher W. Burpo of Continental Oil.

In any case, a project review, conducted while systems are being developed, or a post audit, run after they are up-and-running, can help control the commitment of DP dollars. The choice depends on individual preferences, but prudent managements are using one or both of these techniques, he added.

Reporting the results of a survey in the December issue of the Data Processing Management Association's *Data Management* magazine, Burpo added that questions of organizational responsibility for starting the system review were likewise in detail, though most correspondents agreed with the need for such reviews.

Key Elements

Regardless of whether the study is conducted by personnel within the user's DP staff or by independent internal auditors, if the system review is to provide benefits in excess of its cost, it must contain certain key elements, Burpo found.

The audit must be timely, and neither premature nor so old that it is of historical value only. Many project management schemes, he said, are strictly scheduling tools and "useful intelligence data" is ignored once the job is completed and the management moves to other projects.

On the other hand, the minimum acceptable time frame to be studied in a post audit approach should include preliminary design stages and conclude only after the system has been in operation in a live, hands-on environment for one or more cycles.

The study must be methodical, Burpo's contacts tended to agree, and should examine the basic questions of actual vs. expected performance in every aspect of the original feasibility study, as well as any others deemed pertinent.

And if the DP staff doesn't do its own review, there is a real need for the involvement of an internal auditor "as the recognized evaluator of company affairs," he continued.

Gathering facts, even in an orderly way, is not enough and a requirement for serious review of the data by management is another key to the better monitoring systems. The review varies with managerial personalities and with the significance of the project, he admitted, but the review must be done or there is no benefit.

Publicity of the results of the studies, perhaps in the form of a central library available to planners of future projects, is often overlooked, but it could be of "inestimable value." It would be particularly useful to the inexperienced, Burpo thought, in selecting workable solutions to programming or administrative snags.

Though the educational value is "obvious," he found a need for closely guarded and complete avoidance of personnel evaluation. The goal of any review is to appraise the effectiveness of a system, not its designer, Burpo argued, and this impacts the decision of who should conduct the study.

The study must be objective and any competent person not directly connected with the system is a candidate for selection as evaluator. Consideration must be given to what stake, if any, the evaluator will ultimately have in the findings of the study, he stressed.

## 'Series/J' Generates Test Data, Shows Paths Used, Checks Files

ATLANTA – An IBM 360/370-oriented Cobol program testing system from National Computing Industries (NCI) includes print/compare and trace/certification facilities as well as a test data generator.

The print/compare feature of Series/J prints the user's output files in edited format, with each field identified by its Cobol data name. This facility can also be used to compare successive generations of the same output file, flagging changes – planned and otherwise – caused by program fixes.

The printout of this feature includes conversion of packed decimal fields into readable numerics. Series/J also flags any field containing an unprintable character and prints the field in vertical Hex format for detailed analysis.

The trace/certification feature works at the statement level, rather than with paragraph names or sentences.

As part of its tracing, this feature also reports every logical path that has been exercised in a test session. The programmer can then create special data to force the use of untested paths.

The test data generator builds streams of data in main storage or out of on line files. The test files are formatted in accordance with the File Description (FD) entries of the program to be tested.

The Data Division – including the FDs – is often coded before the Procedure Division of a program is written. With Series/J, test files can be created concurrently with program development and debugging can begin as soon as the user gets a clean compilation, the vendor said.

Acquired by NCI from Business and Technical Systems Ltd., London, Series/J requires no more room than the Cobol compiler with which it is being used. It operates under DOS, OS or VS environments, NCI noted.

A modular system, it varies in purchase price from $2,500 to $6,250 depending on the facilities selected.

NCI is at 6075 Roswell Road, N.E., 30328.

## Burroughs 17K Cobol Enhanced

MOBILE, Ala. – Burroughs B2500/3500 users who have been limited to the 17K Cobol compiler supplied by their vendor can have disk-oriented source program library capability with a package from J.E. Ferris & Associates.

The librarian includes a facility for sorting revised input statements by page and line number before merging them into program source code previously cataloged. This enhancement is "fairly simple," Ferris admitted, but is included to save the effort otherwise needed to put corrections in proper order.

Input may be on cards, disk or tape, and the updated source output may be directed to either disk or tape, a Ferris spokesman noted.

While the enhancements were originally designed to provide the smaller Burroughs user with more than card I/O for his 17K compiler, they have also provided a somewhat unexpected benefit to the larger-scale user.

Although the 17K compiler is heavily overlaid to fit in limited memory, it has had most of the capabilities (except disk support) of the full Cobol-L system, Ferris explained.

The disk-based source program files created by the Ferris package are totally compatible with those created by the larger Cobol-L and "it is entirely possible" to swap from one compiler to the other, Ferris continued.

The librarian is installed by mail, the company said, and the package is available in object code for a one-time charge of $200.

Ferris can be reached through P.O. Box 9192, 36609.

### Plotter Software Brochure

CUPERTINO, Calif. – A new 12-page brochure which describes the Versaplot plotting software is now available from Versatec, Inc., 10100 Bubb Road, 95014.

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# Design Real Key to Efficiency

By Charles A. Mills
Special to Computerworld

The techniques suggested by Jerri Lynn Burket [CW, Dec. 19] represent attempts at efficiency misdirected at the *coding* level. The proper places for saving core and time are at the design stage, where additional analysis can yield major, rather than "byte-size" savings; and, if absolutely necessary, after a program has been partially implemented and is found to be too large or too slow.

Compilers nearly always generate less code for "fallen through" rather than PERFORMed routines; unfortunately, programs with extensive in-line code are usually less clear, and therefore less maintainable, than programs consisting of highly structured or modular code.

The core and CPU time saved by "falling through" is slight. Twenty-four bytes per PERFORM for, let us say, 20 routines are 480 bytes. If the additional instructions take 500 μsec (a generous estimate) per PERFORM to execute, and are found, let us say, in 15 PERFORMs each executed 10 times, and in five PERFORMs each executed 10,000 times, the savings in CPU time amounts to 25 second/run – not enough time in daily runs of the program to pay for even one additional compile per month. And all the saved time might disappear if the program was I/O bound!

Ironically, because of the reduced clarity of the program, a maintenance programmer, in a subsequent modification of the program, might squander all the savings of the suggested technique because he could not understand the original monolithic code. This could easily occur if he added code which duplicated "fallen through" code elsewhere in the program, rather than PERFORMing an existing subroutine.

***Cobol Clinic Counterpoint***

The suggestion regarding the initialization of matrices spotlights a shortcoming of the compiler: the inability to give matrices an initial value. The problem should be attacked at the standards or compiler-implementation level.

The criticism of Burket's technique is that the ANS Cobol manual states, "When the sending and receiving fields of a MOVE statement share a part of main storage . . . the result . . . is unpredictable." It is all too likely that with a subsequent implementation of Cobol (such as for the 370, which has a MOVE instruction that does not allow overlapping operands), all programs using Burket's technique would have to be recoded.

This is not an academic possibility! Early releases of D-level Cobol flagged, but nonetheless compiled, matrices with initial values. A new level of DOS was released, and suddenly a number of shops had a lot of unexpected reprogramming to do.

I am not suggesting that programmers should code with no regard for efficiency. Ken Seidel's suggestions in Part 1 of the Cobol Clinic [CW, Nov. 21] concerning data types are well founded. My feeling is that the main thrust at efficiency should be made at design time, and that line-by-line optimization of programs should be reserved for routines which are overly time- or core-consuming.

*Mills is a consultant with Marcus Powell Associates, Pinole, Calif.*

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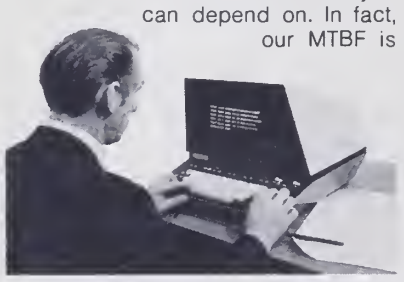

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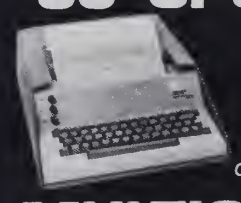

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# COMMUNICATIONS

## Data Briefs

### HP Replaces 2600A CRT, Adds Intelligent Terminal

PALO ALTO, Calif. – Hewlett-Packard has introduced the 2615A CRT, a less expensive replacement for its Model 2600A terminal, and introduced the 2616A CRT, a more intelligent version of the 2615A that offers page-mode operation.

The two models are supplied to Hewlett-Packard by Beehive Medical Electronics, and are similar to that firm's Mini Bee and Super Bee.

The HP 2615A is compatible with teletypewriters using the RS232 interface. The asynchronous unit is capable of 9,600 bit/sec transmission in local operation, compared with the 2600A's 2,400 bit/sec maximum.

The 2615A has a 12-in. screen, 2,000 character buffer, and uses a 53-key keyboard. It works in HP's SIO, BCS, Timeshare, DOS-M, DOS-III, TCS and RTE environments and may be interfaced to the HP 2100 CPUs with interface cards costing either $350 or $400.

The 2615A costs $2,750, $1,100 less than the 2600A.

The HP 2616A offers both character and page-mode operation and has a 2,000 character buffer. Twenty-five lines of 80 characters each are displayed at a time and up to 256 lines can be stored.

The 2616A transmits asynchronously with switch-selectable speeds from 110- to 9,600 bit/sec. It is designed to work in HP's DOS-III, TCS or Image environments, and the unit may be interfaced to HP Series 2100 CPUs with a $550 option. There is an EIA-compatible plug to connect the terminal to a hard-copy printer.

The 2616A's 12-in. display has blink and reverse video, tabulator, 96 upper- and lower-case characters and eight function keys.

Deliveries will begin in February from the firm at 1501 Page Mill Road, 94304.

### Telefile Adds Control System

IRVINE, Calif. – Telefile Computer Products has announced the TCP-64-3 programmable communications control system which uses direct memory accessing to transfer data. The system includes software, a 16-bit processor, a 360/370 interface unit and a 2311/2314-type disk controller.

Typical applications for the TCP-64-3 include: stand-alone data concentration, programmable front-end communications preprocessing, store and forward handling (with disk option), message switching, data multiplexing and data base access.

The TCP-64-3 is available on lease starting at $890/mo (five-year lease). The base price for the TCP-64-3 is $53,360. First delivery is March 1974 from 17131 Daimler St., 92705.

## 17% Monthly Savings

# User Initiates SPCC Data Service

By Ronald A. Frank
Of the CW Staff

SAN FRANCISCO – When a user at Fibreboard Corp. sent a message to the company's computer last week, it was transmitted over one of the first data links established by Southern Pacific Communications Co. (SPCC).

The voice-grade link stretches from San Francisco to Los Angeles and then east to Phoenix and is used by Fibreboard on a 12-hour part-time basis, according to Robert Barnwell, manager of office services, who handles communications for the firm.

The SPCC line between Los Angeles and the company's Honeywell 1644 computer in San Francisco runs side-by-side with four similar lines supplied by Pacific Telephone and Telegraph (PT&T). "When a user dials the computer port he does not know which line is being used," Barnwell explained.

The side-by-side test with Bell lines is giving Fibreboard a good comparison of performance between the two carriers, Barnwell said. The SPCC facility was installed just after Christmas and there have been no major problems. If current performance levels hold, Barnwell said, he expects to get additional SPCC lines "in about 60 days."

The in-house Fibreboard communications net is used for order scheduling, inventory control and accounting information. Eventually it will stretch to the East Coast and how much of this network includes specialized carrier facilities will depend primarily on whether service is available in the particular areas, Barnwell said.

The Fibreboard net transmits messages at two speeds. In Phoenix, acoustically coupled TTY Model 35s transmit at 110 bit/sec to the CPU while data originating in Los Angeles is entered on Univac DCT 500 terminals which operate at 300 bit/sec, Barnwell said. At the computer end of the line, data is transmitted directly into a CPU port through a Bell 113 data set.

About 10% of the traffic on the net is now devoted to data but that amount will increase, Barnwell predicted. The Phoenix location transmits about one hour per day to the DP center with the line used for voice traffic the rest of the time.

Calls on the system are switched through a Bell PBX in Los Angeles but in Phoenix the company uses a non-Bell PBX supplied by Arcata Communications.

Barnwell estimates the SPCC line saves him about 17% compared with comparable facilities from Bell. Between San Francisco and Los Angeles the voice-grade line from SPCC costs $458/mo while PT&T charges $550. Even if Fibreboard used the SPCC line 24 hours instead of at the half-time rate, it would add only about $34/mo to the SPCC cost, and the PT&T line is available only on a full-time rate.

One of the SPCC options Barnwell is considering is an option to use data-under voice facilities from the specialized carrier. One of the cost advantages would be an elimination of modem costs but in addition, the all-digital line could eliminate the switching that is now done at Los Angeles, Barnwell believes.

The actual cut over to SPCC lines was accomplished in "three or four days" with good cooperation from both carriers. Fibreboard first placed its order with SPCC about 30 days before the line went into service. On the local installation level, Barnwell said both PT&T and SPCC craftsmen cooperated very efficiently to get the new service working.

# Terminal Selection Choices Outlined

By Patrick Ward
Of the CW Staff

CLEVELAND – Choosing equipment for a remote terminal system accessing a time-sharing CPU can be a perplexing task, just because there are so many alternatives for the user.

One way to handle the choice is to systematically drop as many alternatives as possible based on two main criteria: performance and cost, subject to the constraint that any combination must be compatible.

This is the approach proposed in a 38-page booklet entitled "Selection of Terminals and Data Protection" published by the Association for Systems Management.

The chapter on "systematic selection procedure," based on a thesis by Capt. Lee W. Wagenhals, Air Force Institute of Technology at Wright-Patterson Air Force Base, proposes a 13-step approach.

This technique involves selecting several candidate terminal and computer site components, based on performance characteristics; selecting a suitable communications system between the components based on their requirements; and then placing the list of candidate assignments on a cost performance decision field for final selection.

The first step in this process is to define the job the chosen system is to perform in terms that will help evaluate the components. For example, what amount of data will be transferred to and from the computer site and stored on files there? Will hard copies be required? What kind of printing characteristics must the terminal have?

The necessary characteristics for each of the major system components – terminals, communications and CPU – should be listed separately.

The next step is to narrow the alternatives. With terminals, for example, the choice could be between teletypewriters and CRTs. If many hard copies are required, CRTs might not be suitable. However, if much file data is to be screened and only a few pieces of information recorded, CRTs might prove better, the booklet noted.

#### Matrix Suggested

The following step is to determine performance criteria using the job characteristics. A matrix is suggested as a means to weight terminal characteristics on a "no importance" to "very important" scale. (The booklet contains illustrations of the matrices and tables described.)

In the next step, terminals which do not satisfy the criteria can be cut from the list.

The user then constructs a weighted attribute matrix for the remaining terminals and ranks the terminals by their scores. These last three steps are repeated for the available CPUs.

The user then weights the terminals and computer sites by selecting two positive weighting factors that represent the importance of the performance capability of the terminal as compared to that of the computer site.

The next step is to calculate a compatibility-effectiveness score. Then the terminals are grouped by speed, and expected monthly connection time for each speed grouping is estimated.

Communications costs for connection times are also estimated perhaps with the carrier's help.

After that step comes costing out the monthly expense of each compatible combination. For purchased components, monthly amortization should be used.

The last step of the procedure is to construct a cost-effectiveness decision field to reveal the best choices.

These steps reduce a large number of alternatives to a few prime candidates, the booklet stated, but final selection is then based on the subjective evaluation of the user based on the vendor reputation, expert recommendation and so on.

The booklet's first chapter is basically a primer on remote terminal system components. The last chapter briefly discusses protection of data in terminal systems.

"Selection of Terminals and Data Protection" costs $4 from ASM at 24587 Bagley Road, 44138.

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# Printer Speaks Hebrew, Arabic

ORLANDO, Fla. – Scope Data, Inc. has a serial, non-impact CRT hard-copy device that prints at speeds up to 240 char./sec on "electrosensitive" paper.

The printer is compatible with CRT units using Ascii. The basic unit prints lines of 80 characters in a 7 x 9 dot matrix at 120 char./sec, with the 240 char./sec speed optional.

An internal clock and selector switch provide for input at 75-, 110-, 150-, 300-, 600-, 1,200 and 2,400 bit/sec.

The KSR version of the printer can serve as an I/O device to minicomputers with RS232C output capability, a spokesman said.

The unit can print in Japanese, Hebrew or Arabic script by means of a $200 option which adds another ROM and a printing font selectable by code, the firm stated.

The receiver/transmitter module is switch-programmable for character widths of from five through eight bits, according to a spokesman.

The Scope Data Series 200 costs $1,800 for the read-only version and $2,055 for the keyboard send-receive version.

Delivery is 60 days from the firm at 3728 Silver Star Road, 32808.

## Acoustic Coupler Built Into Terminal

BEVERLY HILLS, Calif. – Bailey Automation, Inc., a service bureau, is offering a terminal with built-in acoustic coupler for low-volume batch data entry use.

The equipment consists of a keyboard unit containing the coupler, and a cassette recorder "that plugs into any TV set" for displaying formats.

When the cassette is filled, the data is transmitted at 300 bit/sec via the acoustic coupler to an Ascii/Ebcdic converter at the data center.

In operation, the screen displays a protected format and the user keys in variable information following a cursor. The user then visually verifies the entered data and hits a record button to release the data onto the cassette tape, according to a spokesman.

The tape cassette holds up to 18K characters, the firm stated.

The Data-Viewer costs $3,995 purchase or $115/mo plus tax on a four-year lease/purchase plan.

Delivery is off the shelf from the firm at 8665 Wilshire Blvd., 90211.

## Terminal/1472 Price Cut

MONROEVILLE, Pa. – Compunetics, Inc. has lowered the price of its Terminal/1472 to $2,350. The IBM 2741-compatible unit cost $2,900 when introduced two years ago.

The terminal can operate with either Correspondence or BCD codes.

Delivery is 30 days from Compunetics at 1100 Eldo Road, 15146.

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## Bits & Pieces

### S/3-Compatible Printers Provide Savings Up to 30%

DARIEN, Conn. – Digital Associates Corp. has announced two printer models that are compatible with IBM System 3 models 6 and 10. In addition to cost savings (up to 30%), these printers provide improved performance and reliability, and are available in 400 line/min or 600 line/min configurations, the company said.

Designated the DAC/3 series, these printers either replace IBM 5203 and 1403 model 2 printers (including their various control units and CPU attachment features), or provide an upgrade alternative for the System/3 user requiring faster or heavy duty printers, the firm said.

DAC/3 series printers operate through the standard System/3 supervisor and normal printer I/O support routines.

The printers provide 132 column/line, six line/in., and a standard Ebcdic character set.

Prices are $15,000 and $19,600 for the 400- and 600 line/min models, respectively. Monthly leases are available at $520 (400 line/min) and $725 (600 line), and include maintenance, installation and all necessary cables and interfaces to the System/3 CPU. Delivery is 60 to 90 days from the firm at 24 Old Kings Highway S., 06820.

### More Impact Printers for Nova

DANBURY, Conn. – A plug-compatible interface for Data General Nova computers is available for all Data Interface non-impact printers.

Occupying one I/O slot position in the Nova computer, the interface can be connected either directly to the printer via a ribbon cable provided, or by wiring from the I/O slot connector across the back panel to one of the output connectors on the computer frame.

The combination of printer and interface is compatible with Nova line printer software, and additional diagnostic software is provided by Data Interface. The small desktop printer may be located up to 20 feet from the computer, and prints full 96-character Ascii font at rates up to 180 line/min.

The interface is priced at $650. Data Interface is at 4 W. Kenosia Ave., 06810.

### Mini-Ups Provides Power

SAN DIEGO, Calif. – The 10 kVA Mini-Ups from Topaz Electronics provides an uninterruptible power system for protecting equipment. It will operate on power lines of 95 to 130 Vac.

Each 10 kVA Mini-Ups is packaged with battery charger, inverter and choice of either relay or solid-state transfer switch. Meters show battery and output voltage.

Prices start at $11,300 from the company at 3855 Ruffin Road, 92123.

## A Look at a Turnkey System—Part I

# Mini Runs Data Entry, Message System

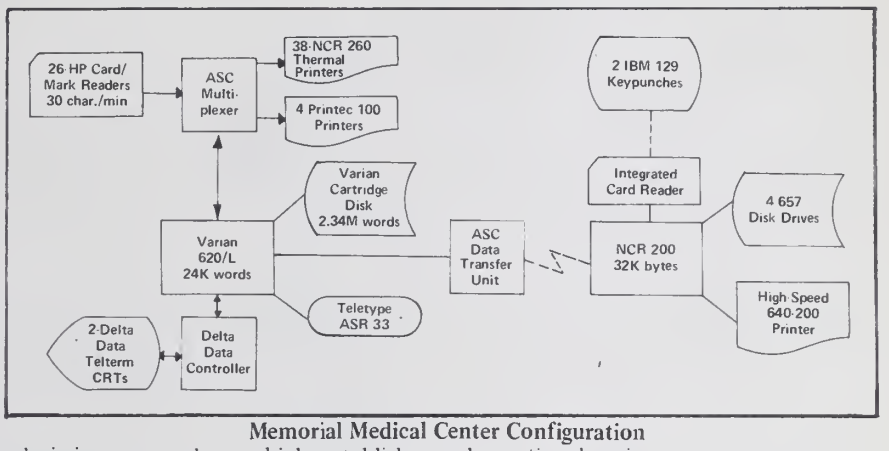
By Vic Farmer
Of the CW Staff

CORPUS CHRISTI, Texas – There's a lot going on in a 500-bed hospital and when the requirements for computerizing data entry and internal communications create the need for 70 I/O devices for efficient operations and a staff of 12 in the DP department is pushing hard to keep up on the regular accounting duties, one answer is a turnkey system.

That's what Memorial Medical Center elected to do when it hired Automated Systems Corp., Houston, to design, install, program and debug a hospital data acquisition and communications system.

The whole satellite system, based on a Varian 620/L minicomputer, cost the hospital $400,000 and included all hardware and software except 38 NCR-260 thermal printers. (see chart)

Spreading the cost over the usual five-year period will cost the hospital about "$1 per patient day," according to Roger Wilgus, manager of communications and information, and it is "well worth the price."




Memorial Medical Center Configuration

### Pool of Information

The satellite system serves a giant pool of information generated by 32 input devices situated throughout the hospital. Two CRT displays handle the complex admissions procedure which establishes the main file for both regular and emergency room patients.

At each nursing station, card/mark readers are used to set up drugs, lab test and X-rays by means of selection and input of appropriate cards from a file.

For example, a simple input deck would include the patient's card, the doctor's card, a number-coded drug card followed by cards that would indicate strength and frequency of dosage. This input would also produce the necessary financial charges.

The card readers are also used for employee time-keeping.

Keyboard printers provide multiple copies of information in the pharmacy including the labels for medicine, lab results and other procedures which cannot be readily handled by the mark readers.

Thirty-eight thermal printers flash to all areas administrative instructions that range from cleaning up a room to scheduling an EKG or physical therapy.

At present, the total system is handling "about 2,500 messages" a day, according to Wilgus.

### Fed to NCR 200

Information from the 620/L mini-disk is loaded into the NCR 200 through a special data transfer unit only once each day. Wilgus is planning an on-line operation in the future, however.

The NCR 200 was in operation before the mini system was installed and it doesn't just sit there letting the mini do all the work. The 200 center operates seven days a week, two-and-a-half shifts a day, using 24 disk packs.

Some of the major programs include in-patient accounting with about 800 active accounts, dismissed accounts/receivable with about 18,000 accounts, payroll for 1,250 employees, accounts payable, general ledger, emergency room billing and accounting, Medicare and Medicaid accounting, and even a special billing and accounting service for the local municipal ambulance service.

Wilgus, justifiably proud of his NCR 200 operation, claims "it will run rings around any IBM DOS system because the B1 operating system is better and cheaper. I defy anyone to show me an IBM system that for $4,600/mo will do what I can here."

But Wilgus, who is chairman of the Federation of NCR User Groups, does have a warm spot for some IBM equipment. He recently replaced two 029 keypunches and two key-to-tape units with two 129 keypunches which he categorizes as "the best damn things around."

*Part II will look at what was involved in putting the turnkey system together.*

# MDS's Small-User Key-to-Disk Has Communications Capability

UTICA, N.Y. – Mohawk Data Sciences has added a shared-processor key-to-disk system with communications capability to its data entry line, designed for small data centers with a four- to 12-keystation requirement.

The 1200 system uses the same keystations as the older 2400 series, but has less programming capabilities.

Packaged with integral disk, tape drive and processor in a single package, the 1200 provides range and extension checks, check digits, accumulations, subtotaling and cross-footing features.

The keystations include a 5 inch CRT which guides job setup, verification and error correction. It has 125-char. page layouts.

One of the keystations may be designated for supervisory functions such as dumps, transfers, startup, closedown, batch searches and status checks.

Four optional printers provide hard-copy printouts. These are a 100 char./sec matrix printer, and 280-, 380-, and 760 line/min chain printers.

Processor storage ranges from 32K to 65K bytes. The disk can hold 8,000 125-char. records, with 14,000 record capacity available. The integral disk is fixed, with removable disk optional.

Two I/O channels may be provided – one for communications and the other for a printer. Communications is in 2780 half-duplex mode at up to 9,600 bit/sec. A 2968 emulator is also offered for large block, terminal-to-terminal communications.

Prices range from $625 monthly rental and maintenance for the control unit with 7-track, variable density tape or 9-track, 800 bit/in. tape, to $700 monthly for the 9-track, 1,600 bit/in. version. Purchase prices are $25,000 and $28,000, respectively.

Prices for keystation rental and maintenance are $50/mo. or $1,800 purchase.

Delivery on the new system is slated to begin in August.

### Inforex Raises Maintenance Charges On Key-to-Disk Data Entry Units

BURLINGTON, Mass. – Inforex has increased equipment maintenance charges for its key-to-disk equipment effective Jan. 1.

The monthly charge for each Model 1301 and 1302 control unit will be increased $10. Extra shift maintenance charges and the hourly per call maintenance charges will be increased between 10% and 14%.

## A Review: All About Mag Tape

*Digital Magnetic Tape Recording for Computer Applications*, by L.G. Sebestyen; Halsted Press, New York; 157 pages, $12.50.

The purpose of this book, as stated in the preface, is to provide the systems analyst, programmer, logic designer and computer engineer with a readable account of the principles and practices of data storage on magnetic tape.

While the treatment concentrates on the magnetic aspects of digital recording, little space is devoted to mechanical problems of tape transportation, servo system design and digital electronics. And for that matter the text does not answer the real problems of the programmer and systems analysts, such as relating tape operation to programming constraints.

The content is split into six basic areas: recording media, magnetic heads, recording theory, recording methods, error detection and correction and tape handling mechanisms – with an extensive list of references provided at the end of each chapter for the reader who wishes to pursue the subject in detail.

## 'Multi' Interface Joins Novas

SYOSSET, N.Y. – Elsytec, Inc. has introduced a 1M word/sec multicomputer interface for Data General Nova computers. MCI-10 interface permits as many as 16 Novas to communicate directly from memory to memory.

Computers can be separated by as much as 250 feet. Previously available multiprocessor interfaces for Novas were limited to 140 kHz word rates and 50 feet of separation, according to the company.

Elsytec is delivering the first MCI-10s in a multiprocessor real-time system in which one computer carries out Fourier Transforms while other computers in the system simultaneously handle data input and post processing.

Data is transmitted serially through four coaxial cables.

The MCI-10, a plug-in board, costs $3,800 per computer to be interfaced, and delivery is within 90 days from the company at 212 Michael Drive, 11791.

### 80 Plus $8,900 Equals 85

OCEANPORT, N.J. – Interdata's Model 80 minicomputer, is now field-upgradeable to the Model 85 with the addition of a Dynamic Control Store (DCS) module for $8,900.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## Bits & Pieces

### Datum Disk Tied To Minicomputer

ANAHEIM, Calif. – Datum's Series 4091 Nova disk system is composed of a disk formatter, computer adapter, up to four magnetic disk (single- or dual-platter) units and interconnecting hardware for installation in standard 19-inch cabinets.

Compatible software, including an I/O driver and diagnostic maintenance program, is available.

Storage capacities of up to 10M 16-bit words per controller are offered, with an access time averaging 40 msec. Each disk drive has one fixed and one removable disk. IBM 5440 cartridges, or approved equivalent, are used. Bit density is 2,200 bit/in.

Complete system prices for the Series 4091 start under $9,000 and deliveries can be made in 60 days.

Datum, Inc. is at 1363 S. State College Blvd., 92806.

### Plotter Plots 22-In. Wide

ST. LOUIS – A 22-inch-wide incremental plotter, available for scientific and general-purpose computer graphics, is plug-to-plug compatible with other 300 step/sec plotters.

The plotter utilizes bidirectional stepping motors on both the paper and the pen axis to produce the incremental steps. Each step of the motor causes either the paper or the pen to move one hundredth (0.01) of an inch (0.25 millimeters optional) in either direction.

Z-fold paper, 400 folds deep (367 feet), is used, which can be separated on perforated lines, every 11 inches for convenient notebook-size foldouts.

Artronix Instrumentation has priced its incremental plotter at $4,500 with OEM discounts available from the company at 1314 Hanley Industrial Court, 63144.

### OCR Unit for DEC Systems

BEDFORD, Mass. – ECRM, Inc. has introduced a DEC paper tape reader emulator interface to connect its 5000 series optical character recognition (OCR) data entry systems directly, on-line to Digital Equipment Corp.'s Typeset-8 and Typeset-11 systems.

The interface generates exactly the same output as a DEC paper tape reader and is designed to plug into the reader connector plug included with the Typeset-8 and Typeset-11 systems.

The interface costs $2,500 and includes electronics, connectors, power control, power supply and ventilation. ECRM is at 205 Burlington Road, 01730.

### Need a Cyrillic Reader?

BEDFORD, Mass. – ECRM's 5200 Autoreader OCR data entry system now scans the Cyrillic alphabet in Russian. It accepts typewritten and edited news copy and other Russian language manuscripts and automatically converts them to input for typesetting computers.

The 5200, announced last June, processes copy at 500 word/min and costs $37,500.

ECRM is at 205 Burlington Road, 01730.

Photographed on location at Glencoe, Scotland.

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# When it's BASF...you know it's

**not the tape that goofed.**

# Warehouse Firm Runs 125 Inventories Simultaneously

By Marvin Smalheiser
CW West Coast Bureau

LOS ANGELES – A warehouse company running the equivalent of 125 inventory control systems simultaneously is saving $1,600/mo with a small on-line system.

The inventory system at Metropolitan Warehouse Co. also gives the company what it feels is a substantial competitive edge while providing the capability for significant new, money-saving systems.

It has already brought about cuts in overtime.

A Singer System 10, Model 80 tracks inventory as it comes in and is shipped out to food markets, hospitals and other outlets throughout the Southwest for some 125 clients.

Metropolitan ships each year about $400 million worth of merchandise ranging from toiletries to Tootsie Rolls.

Charles S. Shuken, vice-president of Metropolitan, praised the greatly enhanced capability at lower cost.

"We can perform things on this we could not afford on competitive gear at double the price. It enables us to do things faster than other people. It gives you a competitive edge," he stressed.

"We're hoping as time goes by to add new peripherals and to use it more and more to run the business . . . to plan the day-by-day work," Shuken added.

CRT has 5K of storage with 11 overlays so clerks can run invoicing accounts receivable and other jobs without stopping order entry work.

The Singer system replaces an IBM configuration costing $5,200/mo that consisted of a 360/20, three disk drives, a printer, card reader, card punch, sorter, collator, keypunch and three verifiers.

The System 10 includes a Model 20 processor with 40K of storage, three CRTs, a work station, card reader, two disk drives, a paper tape punch, line printer and tape drive. The system rents for $3,800/mo.

Each CRT has 5K of storage with 11 overlays to enable clerks to run invoicing accounts receivable and other jobs without stopping their order entry work, the most important and timely task for the company.

Previously, orders were batched to the warehouse, now they are sent in a steady stream.

"Also, as we prepare an order, we know if we have the stock. We don't have to let an order sit until the next batch to know if we have enough stock to cover it," an official said.

The ability to do several jobs simultaneously is possible because the processor is hardware-partitioned and can run with 20 partitions.

Metropolitan is running with four partitions now, two are 10K and two 5K.

By running four jobs at one time, Metropolitan can go from two shifts of clerical personnel to one shift.

The system went on-line in September 1972, and there have been no problems with the system, according to the firm.

## *Small Systems User*

"Maintenance has been very good, the only downtime has been with mechanical devices like the printer," the official said.

The system has been upgraded with a disk drive and printer and there are plans to go to a warehouse reporting system in which time-clocks would be on-line to the processor.

### Replace Terminals?

Metropolitan is also studying whether to replace some communications terminals at its DP center with a computer-to-computer hookup.

A few of the clients have their own peripherals there to get timely information on transactions.

A master bill application of all individual shipments enables Metropolitan to consolidate bills of lading for each shipment so it gets the benefit of a consolidated weight price for routings.

Also, a consolidation savings letter is printed each month and sent to principals to show how much they have saved in shipping costs through consolidation.

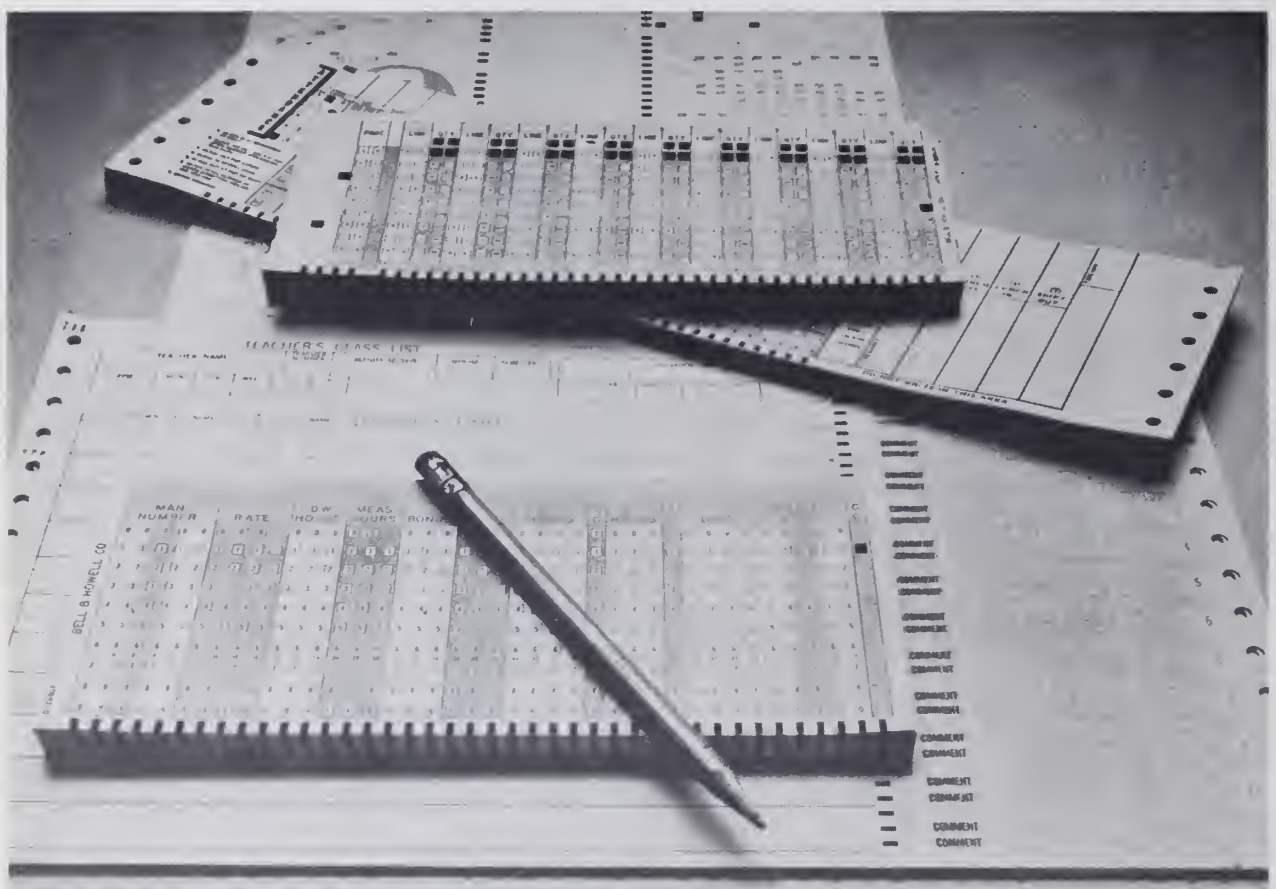
For some clients, he said, the savings run to $3,000 to $5,000/mo.

### Plotter Fits Meta/4 Mini

BELLAIRE, Texas – Houston Instrument has announced a vector mode interface between its Complot DP-7 digital plotter and the Digital Scientific Meta/4 minicomputer.

This interface calculates the best straight line between two points rather than having the computer do this with software. A factor of five to 10 reduction in plotter software overhead can be achieved using this technique.

The price for the interface is $2,850 and it is available from 4950 Terminal Ave., 77401.

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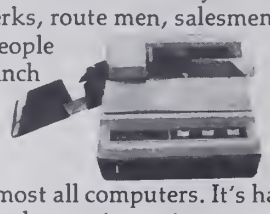

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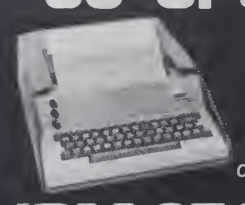

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# Laboratory Systems Focus of Cleveland ASTM Symposium

CLEVELAND – The definition, implementation, evaluation and documentation of computerized laboratory systems will be the focal point of the ASTM Symposium March 4-5 at the Cleveland Convention Center.

The primary goal of the conference, to be held in conjunction with the 25th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, according to organizers, is to provide the scientific community with specific examples of operational systems which have been developed under this concept of automation.

Specific sessions deal with "Minicomputer Automation of Multi-Instrument Physical Chemical Laboratory I," and "System Definition, Functional Design and Implementation of a Dedicated Computerized Laboratory."

There is no registration fee for the conference. Further information is available from Frank W. Kunz, Ford Motor Co. Central Laboratory Services, 30001 W. Miller Road, Dearborn, Mich. 48121.

## Intercon, Nerem to Link Up

NEW YORK – IEEE Intercon and Nerem will be joined to form a major new Eastern Seaboard conference, effective in the spring of 1976.

The board of directors responsible for the activities has agreed in principle to a plan whereby the new conference and exposition will be held in Boston, May 11-14, 1976, in New York in 1977, and alternately each year in Boston and New York thereafter.

## Societies/ User Groups

# Calendar

Jan. 24-25, Gaithersburg, Md. – Symposium on the Management of Data Elements in Information Processing. Contact: Hazel E. McEwen, Institute of Computer Sciences and Technology, National Bureau of Standards, Washington, D.C. 20234.

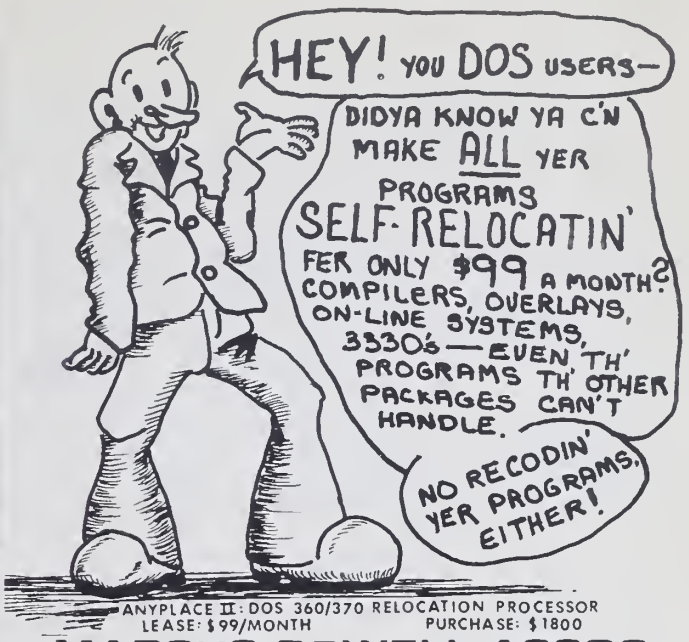
Jan. 25, Orlando, Fla. – Fifth Annual AEDS Conference on the Development and Evaluation of Educational Programs in Computer Science and Data Processing. Contact: Ralph E. Lee, Director of AEDS Workshops, P.O. Box 951, Rolla, Mo. 65401.

Feb. 12-14, Detroit – Computer Science Conference 1974. Contact: Seymour J. Wolfson, Computer Science Conference, 643 Mackenzie Hall, Wayne State University, Detroit, Mich. 48202.

Feb. 12-13, London – Point-of-Sale Systems Conference. Contact: Software World, 322 St. John St., London, E.C.1.

Feb. 25-26, San Francisco – Symposium on Category Theory Applied to Computation and Control. Contact: E.G. Manes, Department of Mathematics, University of Massachusetts, Amherst, Mass. 01002.

Feb. 26-28, San Francisco – Compcon 74. Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.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- Do coding and implementation standards in CICS play an important role?

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Computer Horizons is planning seminars in other cities. If you can't attend this one – please check the city most convenient to you below.

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## Less Experienced

# U.S.-Japan Computer Gap Exists Mainly in Attitude of Users

By Shukan Computer
Special to Computerworld

With the liberalization of Japanese computer trade laws on the horizon, the so-called computer gap between Japan and the U.S. becomes more evident.

The gap among manufacturers seems to be diminishing, although there still appears to be a considerable difference.

Larger than this, however, is a difference in user attitude and thinking. For instance, there is a surprising difference in the attitude toward the pursuit of cost performance. Undoubtedly, cost performance is one of the problems faced by computer installations in Japan too; however, those who have seen American computer installations admit Japan is no match for the rigors of the American posture.

Where does this difference originate? Most Japanese users are less experienced than their American counterparts. The introduction of computers without a clear purpose – thinking of ways to use computers only after installation – is a tendency which seems to be waning, but, on the average, the true nature of computers is only just beginning to be understood. Consequently, the attention of computer installations tends to be focused on full-scale company computerization of the future and on system expansion.

The tendency toward excessive system development cannot be overlooked. There is emphasis on reduction of personnel in various departments, while relatively little concern is shown for the growing numbers of peripherals and computer room personnel.

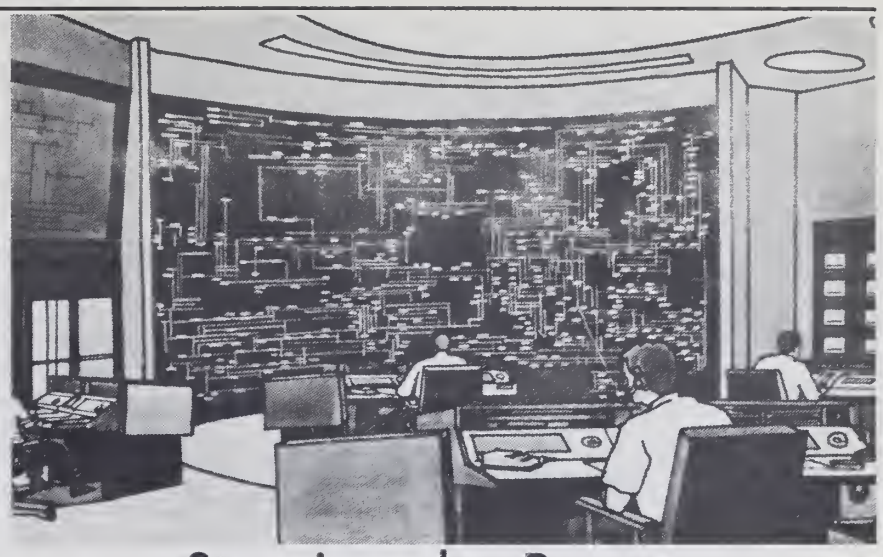
### Transition Phenomena

These are the phenomena of a transition period and it is believed that once users have perfect command of their computers, cost performance will be pursued rigorously. Time will solve this problem, just as an era passed when there was dislike for establishing headquarters in rented buildings and when there was resistance to rented installations.

On the other hand, this difference in rigor is thought to stem from the respective national characters of Japan and the U.S. Most Japanese firms are caught up only in boosting sales, but are far behind the U.S. in their expectations when it comes to pursuing profits to the finish. Is there not a slight trace of this somewhere in the computer room?

The U.S.-Japanese computer gap in hardware is in the process of diminishing due to efforts of the government and the manufacturers concerned. Just as instances of users rushing computer installations before establishing control systems within the company are disappearing, there will undoubtedly come a day when Japanese users, like American users, will be jumping at secondhand computers, regardless of appearances.

Cost performance, too, will become the biggest issue in computer installations. However, it is felt that the gap in the rigor with which it is pursued will continue to remain.



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## Security Checklist

# Do You Have Backup Facilities?

TORONTO, Ont. – Is your computer installation secure?

A simple way to determine the security of your computer system is to check this week's installment of security "musts" concerning equipment backup facilities.

- Designate which jobs are most critical in order of priority in case your equipment is unavailable for a period of time. Know the amount of time these critical jobs require and arrange for a guaranteed amount of processing time per day at the backup installation.
- Choose a backup computer installation far enough away so it is not subject to the same hazards, but close enough to be of service to your organization.
- Choose a backup location with a separate electrical power source, and avoid using a common communications network in communications-oriented systems.
- Consider the provision of enough open floor space, power and air conditioning to install a replacement system quickly if your equipment becomes disabled.
- Ensure that the backup system is compatible with your own in terms of equipment configuration and operating systems.
- Choose an off-site storage location near the backup equipment site, unless storing your backup files and programs at such a location would expose them to a greater risk of damage than at their present location.
- Review your contingency plan for using backup equipment and backup files at least every six months to ensure continuing compatibility.

This checklist was compiled by DCF Systems Ltd., 74 Victoria St., Toronto, Ont. M5C 2A5.

# Spacecraft to Study Atmosphere

WASHINGTON, D.C. – Nasa has launched a maneuverable unmanned spacecraft linked through a computer with scientists in widely scattered parts of the country in a global study of Earth's outer atmosphere.

The purpose of this and two subsequent missions in 1975 is to explore in detail an area from 72 to 120 miles altitude where important energy transfer, atomic and molecular processes and chemical reactions occur that are critical to the heat balance of the atmosphere.

An extensive worldwide investigation of this region will have a significant impact on efforts to construct complete models of Earth's outer environment, and will also add to scientists' understanding of the complex energy-conversion processes which control this environment.

Should a solar flare or other interesting phenomenon occur, a central ground computer complex at the Goddard Space Flight Center, Greenbelt, Md., will enable the 17 scientist-investigators utilizing the 14 onboard instruments to coordinate their activities while the event is actually happening.

In the past, there was no way for such real-time exchange of scientific information. Generally, data was collected by the Nasa field center involved and transmitted on tape or via documents to individual scientists for study over weeks, months or years.

This rapid data exchange among the participating scientists will allow them to use the spacecraft like a laboratory.


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- How to set reasonable performance standards for warranties.
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**Roy N. Freed, a leader in this field.**

Roy Freed has specialized in computer-related legal matters for many years. He has served as inside counsel for a major manufacturer of digital computers, and is currently engaged in provate practice with the Boston firm of Peabody, Brown, Rowley & Storey. He has authored many articles on the various legal aspects of computers – including "Computer Frauds – A Management Trap" *(Business Horizons)* and a reference book entitled "Materials and Cases on Computers and Law." Mr. Freed will personally conduct the entire seminar.

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# COMPUTER INDUSTRY

## CI Notes

### NCR Rings Up Large Sale

DAYTON, Ohio – NCR continues to ring up sales of its POS systems, adding a sizable order from J.C. Penney Co., Inc. for up to 15,000 NCR 280 terminals and 300 NCR 725 in-store computers and associated peripheral equipment.

The order includes 10,000 OCR wands which read merchandise price tags and credit cards. Installation of terminals will begin immediately.

Sources estimate the value of the order at around $60 million.

With this Penney's order, NCR has now received orders for about 75,000 computerized POS terminals and free-standing electronic cash registers of various types, having a total sales value of over $250 million, President William S. Anderson said.

### IBM Costs More in France, Canada

NEW YORK – Prices of most IBM DP products in Canada were raised an average of 4.6% in late December. Rental and service prices will go up by the same amount effective April 1.

IBM Canada Ltd. cited higher costs. Some products introduced within the past year aren't included in the latest increase, the firm said.

In France, sales prices have been raised 2.5% and rental and maintenance prices will go up an average of 4.5% March 1.

### Singer Temporarily Cuts Force

ALBUQUERQUE, N.M. – Singer Co. has temporarily laid off about half of its 1,400 employees at its business machines division plant here where POS terminals and calculators are manufactured.

A shortage of certain electronic parts stemming from factory closedowns over the holidays was cited by Singer for the move.

Several hundred employees will report back to work this week and the rest are expected to report back next week.

### Supershorts

Microdata Corp.'s bookings for the month of November 1973 reached an all-time high of $1.9 million. The previous high was July 1973, with $1.4 million.

– – –

Computer Automation, Inc., plans to open its own printed circuit board facility this month.

– – –

There is no foundation for speculation that a joint venture or corporate relationship between The Foxboro Co. and Computer Sciences Corp. is being negotiated or considered, according to a Foxboro spokesman.

– – –

Recognition Equipment Corp. has developed a prototype OCR wand for use with POS terminals.

## Expansion Need Cited

# DP Picture Better Than General Outlook

By E. Drake Lundell Jr.
Of the CW Staff

NEWTON, Mass. – Even with growing reports of a recession for the general U.S. economy fueled by the energy crisis, the economic outlook for the computer industry itself is not as gloomy.

Compared with the rest of the economy, the prospects for the computer industry in 1974 seem glowing, according to most indications at this time.

First, user surveys conducted both by *Computerworld* and its parent company, International Data Corp. (IDC), both before and after awareness of the energy crisis, indicate computer users definitely plan bigger budgets for next year with part of the increases going to capital outlays.

While the CW survey found users planned to increase budgets on the average of 10% to 15%, IDC predicted "modest" increases in the range of 8% to 10%.

Secondly, IDC reported its preliminary figures show these expected 1974 increases will come on top of "good" if not great increases in 1973, when general-purpose shipments were up 11% and segments such as the minicomputer industry jumped a whopping 50% in terms of new equipment shipped.

Why should 1974 be a good year for the computer industry even in face of a national economic slump?

Computer users do not seem to have the overcapacity problem they had in 1970 and 1971, when the computer industry first found it was not completely recession-proof.

Throughout that recessionary period – when even IBM couldn't meet its domestic quotas by a large margin – users put off new purchases and tried to load their older equipment to a maximum level of use.

Now, much of the installed base is being used to its maximum capacity or close to that level so that many users are going to have to upgrade some portion of their operations just to keep up with the growing demands of the using organizations.

This maximum saturation load seems to be particularly true – although not all the figures are in – for the largest computer users in the country – and they traditionally spend the most money for new equipment in any one year.

There is a definite move in many large organizations toward more communications-oriented systems, which generally call for new equipment for maximum efficiency.

The trend toward centralization continues in many of the large companies, increasing the demand for large mainframes and associated peripherals.

# Telex Files Contempt Charge Testing IBM Interface Ruling

By E. Drake Lundell Jr.
Of the CW Staff

TULSA, Okla. – Telex has asked the Federal District Court here to find IBM in contempt of court for violating one of the injunctions handed down against IBM for its violation of the antitrust laws.

The Telex filing indicated IBM had "willfully violated" the court's final judgment in the case by refusing to turn over interface information to Telex as required by Judge A. Sherman Christensen's ruling.

In another antitrust action, IBM filed an appeal with the U.S. Supreme Court asking for a review of an Appeals Court ruling that upheld a contempt citation against the firm in its antitrust case with the U.S. government.

IBM was found in contempt of court for refusing to turn over certain documents to the government.

Meanwhile, three judges of the U.S. Court of Appeals stayed enforcement of the contempt order pending IBM's appeal to the Supreme Court. This means IBM will not have to pay the $150,000 a day fine until final disposition by the Supreme Court. Previously the order was stayed until Jan. 21 [CW, Jan. 2].

In the Telex case, Telex told the court it had not been given interface specifications for connecting more than minimum memory to the 370/145 II, the 135, 158 and 168 central processors.

Telex also claimed it had not been given electrical interface specifications for connecting the 3803 II with the CPU channel.

IBM said it felt it was in "full compliance" with the order and there was no basis for the Telex claim.

The Telex move is sure to set a precedent in the case and will test the effectiveness of the injunctions handed down against IBM in the case.

The particular injunction in question reads: "IBM is enjoined and required in good faith to make available on request, at the time of first customer shipment of an IBM CPU or its channel, information describing the design of the electronic interface for such product (including the details necessary to describe the characteristics, timing and sequencing of all signals to be interchanged, together with the function of such signals and the expected response to such signals transferred at the interface between such IBM, CPU or ITS channel and the EDP peripheral products cable connected to it) and, in the event that a subsequently shipped IBM EDP peripheral product changes that interface, IBM shall make changes in the above information available at the time such product is shipped."

However, in a footnote to that decision, Christensen said the parties in question (IBM and Telex) and the court would use the previously issued IBM documents to OEM manufacturers "as an aid in construction of this provision."

# DP Chiefs Hopeful for 1974

NEWTON, Mass. – "Both our domestic and international operations may be affected by the worldwide energy crisis in the New Year. We do expect some leveling off in the rate of growth, but we are hopeful that any maladjustment in the economy is of short duration and feel sure that the computer industry will continue to grow at a rate greater than industry in general," said Gerald G. Probst, president of Univac, reflecting a view shared by other mainframe manufacturers.

Several computer executives took a look back at 1973 before commenting on what they foresee for 1974.

Last year was the strongest volume year in the history of Honeywell Information Systems, with especially strong activity in large systems, according to C.W. Spangle, executive vice-president.

Probst reported that Univac has exceeded the industry average with new records established in shipments, revenues and bookings, with commercial orders up an average of 30% over a year ago.

Projections for 1974 were generally optimistic, but with certain reservations due to the energy crisis.

"It seems likely that there's going to be a slowdown from the current high level of economic activity," said Frank T. Cary, chairman and president of IBM. "But I think it's premature to classify the slowdown as a recession."

"Supply shortages in some areas will continue to place upward pressure on prices unless demand slackens more than appears likely," he noted, adding that the government's fiscal and monetary policies will play a crucial role in the period ahead.

Cary commented that a big plus in 1974 will be "our improving balance of payments situation."

"We expect to have another good growth year in 1974," said Probst, "but because of numerous uncertainties affecting the business climate, it may be difficult to maintain the same high rate of growth we have enjoyed in 1973."

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*Promoting the Industry Is the Issue*

# UK Official Defends Sole-Sourcing

LONDON – Industrial Development Minister Christopher Chataway recently defended the government's policy of sole-sourcing or single-tendering DP equipment as "simple and straightforward."

He made the remark during a meeting of the Commons subcommittee on the computer industry while criticizing some of the group's suggestions on how to promote the UK computer industry.

Not only would the suggestions be difficult to administer, he said, but they "involve decisions being made on the basis of a number of criteria. Among them is the degree to which the UK firm is able to influence its parent company, and control its affairs in this country."

This called for such a subjective judgment, he said, as to be "administratively almost impossible. The room for argument between the government and the industry would be enormous," he added.

Chataway, in addition, said there would be difficulties with another criterion suggested by the committee – the consideration of the long-term effect of the worth of the contract on the UK industry.

Chataway also emphasized to the group that although the government does provide financial aid to ICL, "we must not . . . attempt to manage the company."

He explained that it was up to ICL to determine what orders to bid on.

"I would strongly resist any attempt by my officials to delve into the management of ICL and tell them which orders to go for," he added.

The subcommittee was examining the $16.6 million order let to IBM by the British Airways Board. ICL, he said, "decided not to compete for the order because they thought it unwise to commit the very large resources necessary to achieve the program conversion."

Referring to the selection of a Xerox system over a laboratory system being developed with some government funds by Computer Technology Ltd., he noted, "It would be wrong for government agencies to be required to take a system, simply because that system had received some support from the government."

# CCI Plans to Exit From Chapter XI With Bank's Help

CW West Coast Bureau

LOS ANGELES – Computer Communications, Inc. (CCI) plans to work its way out of Chapter XI without a merger and hopes to achieve that goal by early February.

Raymond E. High, president of the financially troubled firm, said the company has obtained $500,000 in capital from a bank which will help CCI strengthen its position.

**Operations Profitable**

"CCI has been operating extremely profitably," High said, adding, "We have raised adequate capital to keep the company operating day-to-day with a cash flow profit."

For the first quarter ended Sept. 30, the company reported earnings of $101,165 or 6 cents a share on revenues of $1.2 million. This compares with earnings of $128,821 or 8 cents a share on restated revenues of $1.5 million for the first quarter of 1972. Year-ago earnings also included a special charge of $1.8 million for a change in accounting.

**Data 100 Pact Off**

An agreement to sell an 81% interest in the company to Data 100 Corp. was terminated in mid-December.

High said a plan of arrangement will be submitted in bankruptcy court early this month which would provide for issuance of stock to creditors in lieu of the debt and provide unsecured creditors to take up to $200 in cash in lieu of common stock.

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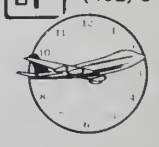

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# Honeywell Reorganizes DP Operations

WALTHAM, Mass. – In a move designed to improve its capabilities as a "total systems" computer company, Honeywell, Inc. has formed the North American Systems Operations (Naso) to assume the functions formerly performed by the Computer Systems Division and the Peripheral Devices Division.

The move consolidates responsibilities for design development and manufacturing of CPUs, software and peripheral equipment.

"This action to integrate North American operations will provide increased flexibility and efficiency in the use of our total technical and manufacturing resources," according to Robert P. Henderson, vice-president and general manager of Honeywell's North American computer operations.

"Further, it will enhance our ability to meet future customer demands and product schedules," he added.

### Five Components

The new division consists of five components, according to Lee E. Sheehan, vice-president in charge of Naso.

Boston Computer Operations has responsibility for Series 200 and 2000 computers, minis and Keyplex units.

Phoenix computer operations remains in charge of the Series 6000 systems.

Computer Engineering Operations is in charge of all hardware and software engineering for Boston and Phoenix.

Peripherals Operations are in Tampa and Phoenix.

## Apeco Selling Computer Division

EVANSTON, Ill. – Battered by the effects of the energy crunch on its boat building and recreational vehicle divisions, Apeco Corp. has hung out the "for sale" shingle on its Cascade Data Division, which it acquired in mid-1972.

The firm is still filling orders from its backlog and is providing ongoing service to its customer base for its turnkey systems, but is not taking new orders.

### Lack of Resources

"We still believe in the product and the industry," a spokesman stated, and "while we can see a possible breakeven by fiscal 1975, we just don't have the resources at this time to carry a weak division, and pumping good money after what could be bad money," observed President Layton L. Rautbord.

The computer division had an operating loss of about $1 million in fiscal 1973, while corporate earnings were about $500,000.

The decision to write off Cascade will result in an after-tax loss of between $4 million and $5 million, and the firm is also planning several other write-offs that will total about $500,000 after taxes, he said.

## Wema Group to Study Energy Crisis Impact

PALO ALTO, Calif. – The Western Electronics Manufacturers Association (Wema) has formed an action group to evaluate the impact of energy shortages on California's high-technology companies and devise a plan to deal with it.

The group, known as the Wema California Energy Policy Advisory Committee, will work with government officials to advise them of the most pressing energy needs of segments of the electronics industry.

The association is also encouraging its members to voluntarily cut back on energy consumption.

## OEMs to Exhibit Wares At Invitational Show

DALLAS, Texas – Original equipment manufacturers will be able to get a good look at the equipment of 11 exhibitors at the Southwestern Invitational Computer Conference here, Jan. 22.

The Remex Punched Tape Emulator, a dual-drive digital cassette, will be shown at the conference, along with ISS/Sperry Univac's 733-OEM disk storage drive. The ISS unit features a storage capacity of 100M 8-bit bytes and additional circuitry to minimize the interface controller effort, the firm said.

Other exhibitors at the conference include General Automation, EMM, Caelus Memories, Data Disc and Orbis Systems, Inc.

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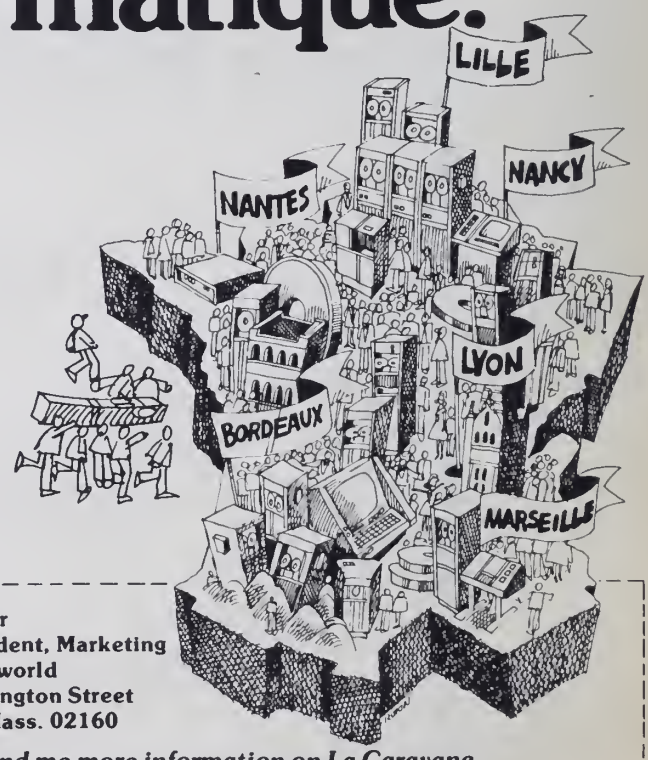


If you're marketing in the rapidly growing French computer market or if you want to be – La Caravane Informatique is a selling tool you shouldn't pass up. Here's the schedule:

| Dates | City | Sites |
|---|---|---|
| February 26-28 | Lyon | Palais de Congres |
| March 5-7 | Marseille | Palais de Congres |
| March 12-14 | Bordeaux | Foire Internationale |
| March 19-21 | Nantes | Foire de Exposition |
| March 26-28 | Lille | Palais de Expositions |
| April 2-4 | Nancy | Palais de Expositions |

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# Executive Corner

## Eugene Prince Joins Storage Technology

LOUISVILLE, Colo. – Eugene Prince has joined Storage Technology Corp. as executive vice-president of operations.

Prince was formerly affiliated with Ampex Corp. as vice-president and general manager of the Computer Products Division, a position he held since 1966.

Raymond F. Livingstone Jr., vice-president of finance and treasurer, resigned from his position with STC. Livingstone plans to establish his own lease financing and financial services firm.

### Witham Named IBM Treasurer

ARMONK, N.Y. – Bertram H. Witham has been elected treasurer of IBM, effective Feb. 1. He is currently IBM World Trade Corp. vice-president. Witham succeeds Harry M. Sibley, who is retiring after 32 years with the firm.

Replacing Witham as World Trade's chief financial officer is James J. Forese, who has been elected vice-president, finance, of World Trade.

### Navarre Resigns From Tally

KENT, Wash. – Leslie A. Larsen has been elected president and a director of Tally Corp., replacing James E. Navarre, who resigned. Larsen joined Tally in 1967, spent several years heading its two European subsidiaries, and was elected vice-president, marketing, earlier this year.

### Other Moves

- Robert C. Pitney has resigned as executive vice-president and a director of Pitney Bowes. Pitney, whose father was a cofounder of the company in 1920, had been with the firm for 39 years.
- Carroll A. Pedigo has been named president of the Business Services Division of Scientific Software Corp.
- Robert L. Michelini has been named president of ACTS Computing Corp.
- J.M. Belhumeur Jr. has been appointed president of World-Wide Systems Corp., a subsidiary of Scan-Optics, Inc. He will continue to act as secretary-treasurer.
- William Clayton Jr., president and chief executive officer of Clayton Manufacturing Co., has been elected to the Board of Directors of Microdata Corp.
- Paul W. Emery II has joined Xynetics, Inc. as corporate vice-president, finance, and treasurer.
- Robert S. Wiggins has been named senior vice-president of the new Medical Communications Division of Technicon Corp.

# Teale Center Turned Over to IBM But Contract Still Under Fire

By Marvin Smalheiser
CW West Coast Bureau

SACRAMENTO, Calif. – The Stephen P. Teale Center site has been turned over to IBM for installation of some 350 pieces of equipment by Feb. 1.

And unless it has the equipment up and running by that date, it faces penalties of $10,000 a day as well as the loss of rentals.

The controversial contract, however, may not be in the clear even when the equipment is operational since Sanders Data Systems and Control Data Corp. have both indicated dissatisfaction with the contract negotiations and award.

Sanders has registered a protest and Control Data has written the state attorney general's office asking an investigation of possible antitrust violations.

Also, if the state Assembly Ways and Means Committee decides it is unhappy with the contract award, it could still hold back funds necessary for the contract.

### Bidders Unclear

A state EDP spokesman said some of the bidding companies were not clear on the bidding procedure, which required a best price offer, rather than one that could be extensively negotiated after submission.

"It's time they started taking the state seriously when it asks for a best price," he said. "The bid had to be a best price and negotiations were made only on the basis of a solid, firm offer. Some firms want the state to rewrite their proposals for them."

In its letter to the state attorney general's office, Control Data expressed concern that the Business and Transportation Agency and IBM might not have complied with legislation regarding the contract award.

It asked if the negotiations were consistent with state and federal antitrust laws or were a restriction of competition by IBM.

IBM has 30 days – from Dec. 31 to Feb. 1 – to get up and running two 370/165s, 110 spindles of disk storage, 20 tape drives, five printers, three card readers and all the communications equipment needed for the installation.


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# CI Notes

## 20% of HP Business Called Intra-Corporate

CW West Coast Bureau

PALO ALTO, Calif. – It's a "misconception" that Hewlett-Packard sells most of its computers to other divisions within the corporation, a spokesman said.

Only 20% of the HP business is intra-corporate (e.g. slated as components in measurement devices), while 30% is "trade OEM" and 50% is end user, an official commented.

The fastest growing of these segments is trade OEM, which experienced a 134% surge last year, despite an overall growth of 40% within the OEM area and a slower growth for data systems in general, the official commented.

### GTE Divides Marketing Units

STAMFORD, Conn. – GTE Information Systems, Inc. has formed two separate divisions to handle the marketing of data communications, and brokerage systems and products.

The new structure is intended to maximize the company's effectiveness as a full-line supplier in the data communications marketplace, according to President Alexander E. Patterson Jr.

### Spur to Release Controllers

SANTA MONICA, Calif. – Spur Products Corp., which has been building interfaces to connect IBM 1401 printers to non-IBM mainframes such as Burroughs, XDS, DEC and General Automation, will shortly release a complete line of off-line print station controllers.

The off-line print stations will use either a PDP-8 or SPC-16 to run up to four 1403 printers from a spooled tape. The systems, without printers, will be priced at $35,000 for a one-printer controller, $60,000 for a two-printer controller and $103,000 for a four-printer controller configuration.


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## Wavetek, Wiltek

# Communications Firms Earnings Rise

The year 1973 proved to be a profitable one for several communications firms.

Wavetek reported record revenues and earnings and Wiltek Inc.'s results rose sharply. General DataComm Industries, Inc. recorded increased revenues, although earnings declined.

For the year ended Sept. 29, Wavetek earned $613,150 or 71 cents a share, an improvement of 35% over earnings of $453,985 or 57 cents a share for the previous year.

Revenues reached $8.9 million, an increase of 34% over revenues of $6.7 million last year.

President John M. Thornton attributed the performance to strong sales of the company's general-purpose test equipment.

In data communications systems, revenues improved significantly over a year ago, although the operation showed a loss for the year.

Thornton said this is an emerging business, still involved in hardware and software development. However, he anticipates data communications systems to be profitable in 1974.

### Fourth Quarter Improves

At Wiltek earnings for the year ended Oct. 31 were up 20% from the previous year as a result of a sharply improved fourth quarter.

Earnings for the year totaled $404,000 or 29 cents a share compared with $330,000 or 23 cents a share last year.

Revenues nearly doubled to $12.5 million from $6.3 million.

Earnings during the fourth quarter reached $227,000 or 17 cents a share on sales of $4.1 million, compared with earnings of $50,000 or 3 cents a share on sales of $2.1 million in the same year-ago period, when there was a $50,000 special charge for relocation of facilities.

President Robert J. Amman explained that the sharp rise in earnings continued a trend which began in the second quarter of 1973 when Wiltek moved to larger facilities, permitting expansion of manufacturing operations.

Wiltek has concluded an agreement with Merchants Bank & Trust Co. in Norwalk and Chemical Bank in New York for an 18-month revolving line of credit for $7 million.

General DataComm reported earnings of $386,224 or 27 cents a share for the year ended Sept. 30, compared with $472,710 or 38 cents a share last year.

Included in 1973 results are technical assistance and licensing fees amounting to $308,673 from European marketing operations.

Revenues in 1973 were a record $6.8 million, up 37% from $5 million reported in 1972.

# Reserve for Unrecoverable Costs Leaves Tally With Increased Loss

KENT, Wash. – With the establishment of a $500,000 reserve, losses at Tally Corp. continued to mount in the third quarter and nine months ended Sept. 30.

The loss for the nine months amounted to $1 million compared with $663,813 for the same period a year ago. The 1973 figure includes an extraordinary loss of $111,261 from the disposition of the EDP Division in the second quarter, and a provision of $500,000 for estimated unrecoverable product costs recorded in the third quarter.

Revenues for the nine-month period totaled $9.4 million compared with $9.3 million in 1972.

In the third quarter, the firm lost $393,707 on revenues of $3.4 million compared with a loss of $233,671 on revenues of $3.1 in the 1972 period.

In June 1973 Tally entered into licensing agreements with two manufacturers granting nonexclusive rights to manufacture certain products. Licensing fees relating to these agreements have been recorded as a recovery of deferred research and development costs during the third quarter, the firm said.

Certain 1972 costs and expenses have been restated to conform to 1973 figures.

# Datapoint Earnings, Revenues Soar

SAN ANTONIO, Texas – First-quarter earnings and revenues soared at Datapoint Corp., with earnings rising to $758,000 or 38 cents a share compared with $156,000 or 10 cents a share in the year-ago period.

In the recent quarter, earnings included a $265,000 special credit, compared with a $77,000 credit a year ago.

Revenues rose 141% to $6.8 million from $2.8 million a year ago.

The purchase value of equipment shipped during the quarter rose by 210% to $11.6 million from $3.8 million during the same 1972 period.

The company is beginning construction of a 120,000-sq-ft addition to corporate headquarters here, which will almost triple production capacity, the firm said.

Datapoint expects earnings of about $1 a share for the year ended July 31, assuming no major economic recession and no substantial issuance of additional shares of common, according to Michael E. Faherty, vice-president and chief financial officer.

## ...Toward the Bottom Line

**Four-Phase Systems** has privately sold $14 million of convertible subordinated notes due in 1983. Proceeds will be used to reduce bank debt and to provide additional working capital.

$$$

**Keydata Corp.** anticipates continued steady increases in both revenues and earnings for the balance of the current fiscal year.

First-quarter earnings were $303,000 or 11 cents a share, a substantial increase over the $176,000 or 6 cents a share in the comparable period a year earlier. Revenues were $2.8 million compared with $2.1 million in last year's first quarter.

$$$

**NCR** declared a regular quarterly dividend of 18 cents per share on common stock payable Jan. 25 to stockholders of record on Dec. 14. Since April 25, 1972, the dividend rate has been 10 cents per share.

The acquisition of American Data Corp. in June 1973 was reflected in **Airpax Electronics'** increased earnings. In the nine months ended Sept. 31, earnings rose to $739,069 or 98 cents a share compared with $380,705 or 65 cents a share, including a $24,200 special credit in the year-ago period.

$$$

**United Computing Systems** earned $1 million in the nine months ended Sept. 30 compared with a loss of $503,000 for the 1972 period. Revenues rose 63%.

$$$

**Singer** issued notes to **Keane Associates** for $1.2 million payable over three years and has assumed $380,000 of Keane liabilities in the form of notes payable in return for acquisition of Keane's System/4 installed base and marketing rights for the system in the northeastern U.S.


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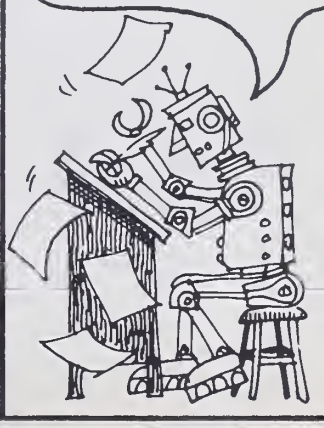

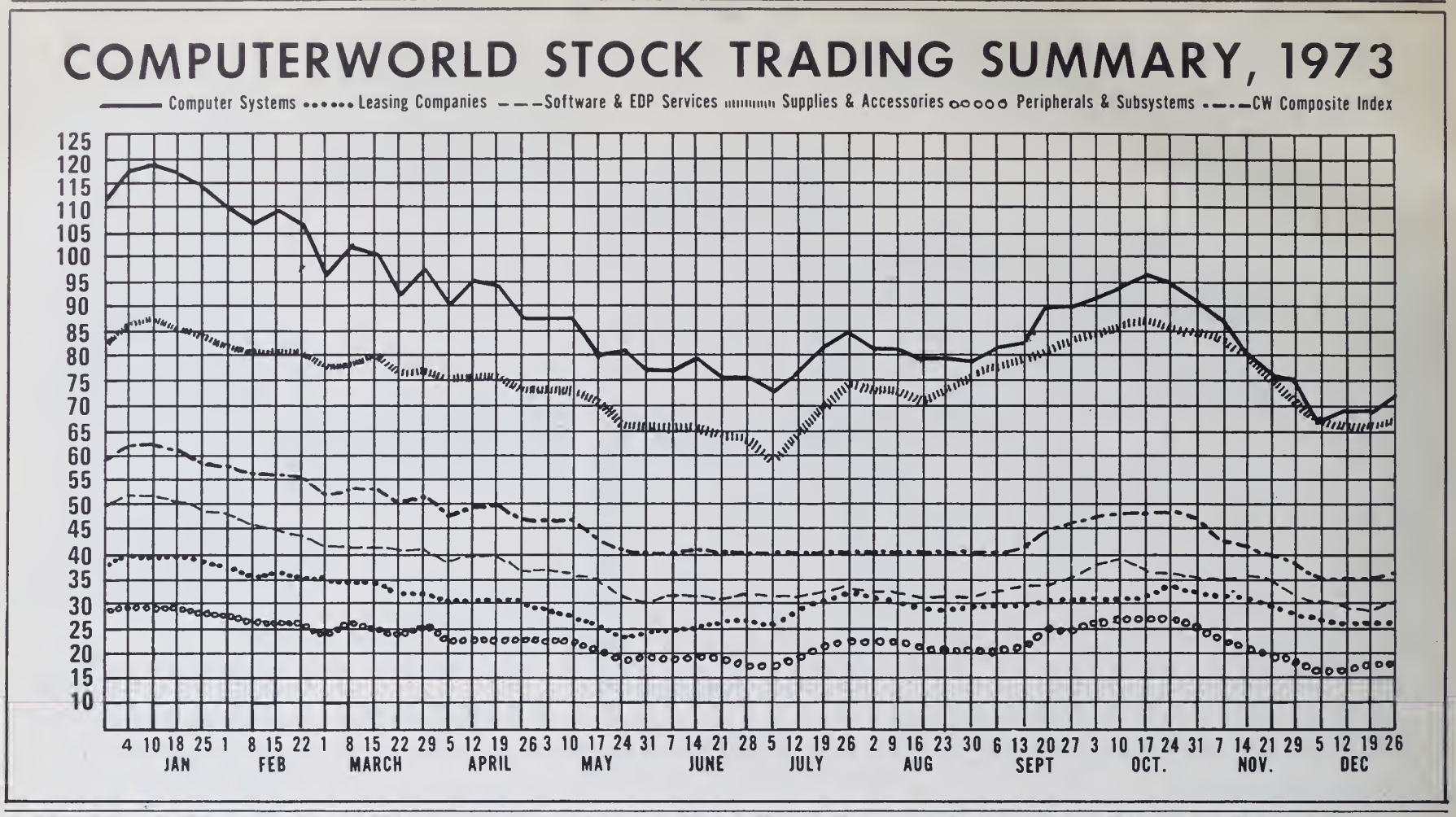


# 1973 Was Rollercoaster Ride for Most Mainframers

By Molly Upton
Of the CW Staff

While 1973 was good for most hardware makers, with many mainframers reporting record earnings and revenues, this wasn't always evident from the activities of the stock market.

Just as 1972 was a relatively stable year, with no earthshaking tumbles or climbs, in 1973 the mainframers tracked across the chart in a manner similar to a rollercoaster ride, with the emphasis being on the downward thrust after the high of the year in the second week in January.

Over the year the mainframers' stock index tumbled from 118 to about 68, a drop of 50 points. In 1972, by contrast, the mainframe index spanned 30 points.

Generally, events within the industry don't seem to have much bearing on the reaction of mainframe stocks, although perhaps there are some exceptions.

The general decline began around Jan. 18, which was about when the IBM/CDC settlement was announced. The week of Feb. 22 was notable for a precipitous 10-point drop, followed by a partial recovery.

No significant events appear to be tied to that drop.

The index generally stumbled downward to a low of 73 on June 5. Afterwards it proceeded to climb to 85 in three weeks.

On Oct. 17 the mainframe index climbed to its high for the second half, 95.

In September Telex won its suit against IBM and Calcomp filed suit against IBM, but the upward trend had already started.

### Energy Crunch

From Oct. 24, the industry's performance in the stock market disproved all thoughts of imperviousness to the vagaries of the economy when the energy crunch hit Wall Street.

The mainframe index fell from 95 to 68 in six weeks.

This could well have been a record year for a flat composite index, which from May 24 to Sept. 13 budged no more than a couple of points.

The composite index spanned about 28 points over the year.

DP stocks generally were no different from others on the New York Stock Exchange and the American Stock Exchange.

Only 197 common stocks on the NYSE and 98 on the Amex gained in value during 1973 and more than half of the Big Board stock and nearly three-fourths of Amex showed losses for the year of 30% or more, according to an analysis by Interactive Data Corp.

Investors who sold IBM above 310 after the five-for-four stock split should consider themselves lucky, for between the end of June and the end of the year the stock dropped more than 60 points.

IBM started off the year at a healthy 411-3/4, rising to a high of 457 before the five for four split.

Memorex started off at 17-1/2 and proceeded downhill, reaching 8-1/2 by March 29 and 2-1/2 on Dec. 19.

Burroughs began the year at 224-1/4, rose to 239-3/4 on March 29 and 237-1/8 at the end of September. Then it succumbed to the general trend and was at 204-3/4 as of Dec. 31.

Control Data Corp., despite acquiring Service Bureau Corp. during the first part of the year, fell from 60-3/4, jockeying between 45 at the end of March and September and 35 in June, ending at 33-3/4 on Dec. 31.

Digital Equipment Corp. and NCR finished better than they started, with DEC starting at 93-1/2, hitting a high for the year of 119 and a low of 73, ending up at 101-3/4 on Dec. 31.

NCR started at 31-7/8, reached both 26 and 46, and stood at 34-3/4 as of Dec. 31.

Data General also appeared strong, ending the year at 38, after a 3 for 1 stock split during the year, which it began at 112.

Honeywell and Sperry finished lower for the year, with Honeywell starting at 135, hitting a high of 140 and a low of 67-1/2, settling at 70 on Dec. 31.

Sperry slipped slightly from 49 to 43-3/4 by Dec. 31, hitting a high of 56 and a low of 35.

Calcomp stock seemed to get a boost around the time Telex won its suit, rising from 7 to 12-7/8 between June 28 and Sept. 27, but then slid down to close at 6-7/8 Dec. 31. It opened around 12.

Telex was pretty much the same story, opening at 5-3/4, and climbing from 3-7/8 to 5 between June and September, and then declining to 2-1/2 at year end.

Lessors seemed to take their lumps in the market, with Computer Investors Group, DPF and Greyhound stocks all closing the year at around half of their opening prices.


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- Librarian is online to the master file

Clean Interface to OS/360/370

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- No JCL changes required

Maximizes Resources

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# Earnings Reports

**LOGICON**
Three Months Ended Sept. 30

| | 1973 | 1972 |
|---|---|---|
| Shr Ernd | $.10 | $.15 |
| Revenue | 4,496,022 | 3,122,606 |
| Earnings | 86,717 | 141,015 |
| 6 Mo Shr | .18 | .30 |
| Revenue | 8,383,051 | 6,165,253 |
| Earnings | 157,700 | 271,382 |

**MSI DATA**
Three Months Ended Sept. 30

| | 1973 | 1972 |
|---|---|---|
| Shr Ernd | $.14 | $.07 |
| Revenue | 4,930,332 | 3,209,421 |
| Earnings | 283,469 | 121,094 |
| 6 Mo Shr | .25 | .12 |
| Revenue | 9,104,212 | 6,173,857 |
| Earnings | 495,884 | 209,610 |

**PLANNING RESEARCH**
Three Months Ended Sept. 30

| | 1973 | 1972 |
|---|---|---|
| Shr Ernd | $.09 | $.09 |
| Revenue | 25,254,610 | 22,898,947 |
| Earnings | 612,568 | 581,900 |

**BOLT BERANEK & NEWMAN**
Three Months Ended Sept. 30

| | 1973 | 1972 |
|---|---|---|
| Shr Ernd | $.21 | $.18 |
| Revenue | 5,149,500 | 3,661,000 |
| Earnings | 264,200 | 230,600 |

**SYSTEM DEVELOPMENT**
Three Months Ended Sept. 23

| | 1973 | a1972 |
|---|---|---|
| Shr Ernd | $.21 | $.17 |
| Revenue | 19,320,000 | 15,963,000 |
| Earnings | 404,000 | 313,000 |

a-Restated to reflect one-for-two reverse split in October 1972 and pooling-of-interests in September 1972.

**OCEAN DATA SYSTEMS**
Year Ended June 30

| | 1973 | 1972 |
|---|---|---|
| Shr Ernd | $1.18 | $.51 |
| Revenue | 1,931,106 | 960,718 |
| Tax Cred | 33,400 | 22,700 |
| Earnings | 141,843 | 58,511 |

**NASHUA**
Three Months Ended Sept. 28

| | 1973 | a1972 |
|---|---|---|
| Shr Ernd | $.59 | $.49 |
| Revenue | 57,681,000 | 42,828,000 |
| Earnings | 2,670,000 | 2,218,000 |
| 9 Mo Shr | 1.86 | 1.51 |
| Revenue | 162,043,000 | 125,339,000 |
| Earnings | 8,439,000 | 6,807,000 |

a-Restated to include the results of Perfection Photo Co., Inc. on a pooling-of-interests basis.

**MICRODATA**
Year Ended Aug. 31

| | 1973 | 1972 |
|---|---|---|
| Shr Ernd | $.41 | $.52 |
| Revenue | 8,743,110 | 6,243,368 |
| Tax Cred | 280,000 | 318,000 |
| Earnings | 623,469 | 676,643 |

**CORDURA**
Year Ended Oct. 31

| | 1973 | 1972 |
|---|---|---|
| Shr Ernd | ..... | $1.20 |
| Revenue | $88,797,000 | 74,890,000 |
| Disc Op | (19,791,000) | 580,000 |
| Spec Chg | a2,403,000 | ..... |
| Earnings | (16,662,000) | 7,529,000 |

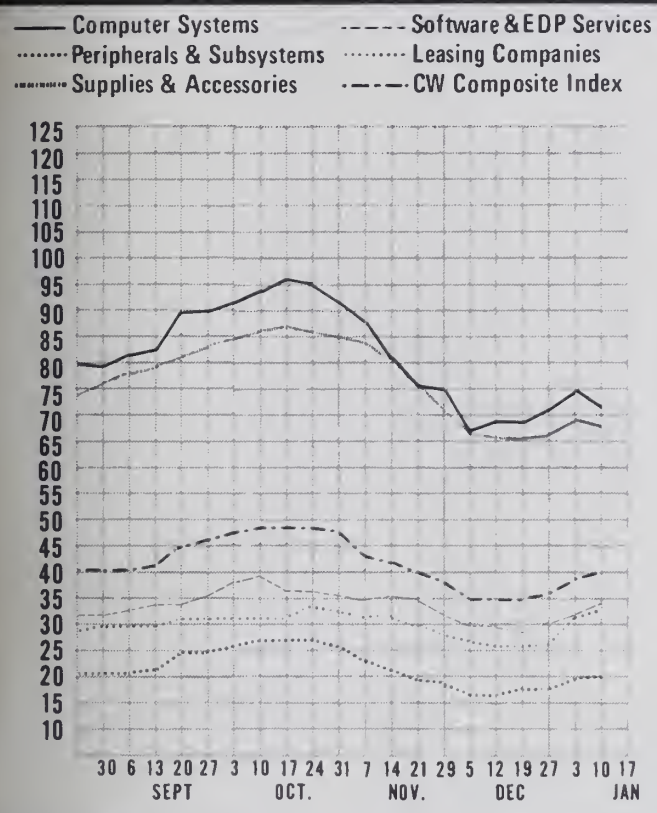
a-From cumulative effect of accounting changes.

**GENERAL INSTRUMENT**
Three Months Ended Nov. 25

| | 1973 | a1972 |
|---|---|---|
| Shr Ernd | $.61 | b$.38 |
| Revenue | 112,547,764 | 84,439,177 |
| Earnings | 4,546,861 | 3,033,717 |
| 9 Mo Shr | 1.46 | b.89 |
| Revenue | 313,924,519 | 232,538,836 |
| Earnings | 11,124,830 | 7,306,239 |

a-Restated to reflect subsequent pooling-of-interests. b-Adjusted for a stock dividend paid in May 1973.

## COMPUTERWORLD Computer Stocks Trading Indexes





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TRADE*QUOTES

# Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

| EXCH | | 1973-74 RANGE (1) | CLOSE JAN 10 1974 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| | **COMPUTER SYSTEMS** | | | | |
| N | BURROUGHS CORP | 175-252 | 175 1/4 | -29 3/4 | -14.5 |
| N | COLLINS RADIO | 16- 26 | 24 3/4 | 0 | 0.0 |
| O | COMPUTER AUTOMATION | 5- 20 | 11 5/8 | -2 5/8 | -18.4 |
| N | CONTROL DATA CORP | 31- 62 | 33 | -2 1/2 | -7.0 |
| O | DATA GENERAL CORP | 28- 49 | 30 1/8 | -4 3/8 | -12.6 |
| O | DATAPOINT CORP | 10- 21 | 13 | -1 3/4 | -11.8 |
| O | DIGITAL COMP CONTROL | 2- 6 | 2 1/8 | - 1/8 | -5.5 |
| N | DIGITAL EQUIPMENT | 73-117 | 84 5/8 | -12 3/8 | -12.7 |
| N | ELECTRONIC ASSOC. | 2- 9 | 2 7/8 | 0 | 0.0 |
| A | ELECTRONIC ENGINEER. | 6- 14 | 8 1/2 | + 1/4 | +3.0 |
| N | EDX/ROPO | 23- 48 | 45 | -2 5/8 | -5.5 |
| O | GENERAL AUTOMATION | 22- 55 | 31 | -2 1/2 | -7.4 |
| O | GPI COMPUTER CORP | 1- 3 | 7/8 | + 1/8 | +16.6 |
| N | HEWLETT-PACKARD CO | 70- 99 | 69 7/8 | -11 1/2 | -14.1 |
| N | HONEYWELL INC | 68-139 | 73 | -5 1/2 | -7.0 |
| N | IBM | 227-340 | 229 | -10 1/4 | -4.2 |
| O | INTERDATA INC | 7- 14 | 8 1/4 | - 7/8 | -9.5 |
| D | MICRODATA CORP | 2- 10 | 3 3/4 | - 1/4 | -6.2 |
| N | NCR | 27- 46 | 28 7/8 | -2 7/8 | -9.0 |
| N | RAYTHEON CO | 22- 35 | 28 3/8 | -2 1/8 | -6.9 |
| N | SINGER CO | 35- 74 | 38 | -2 | -5.0 |
| N | SPERRY RAND | 36- 56 | 37 3/4 | -6 | -13.7 |
| A | SYSTEMS ENG. LABS | 1- 8 | 1 5/8 | - 1/2 | -23.5 |
| N | TEXAS INSTRUMENTS | 83-138 | 95 5/8 | -11 7/8 | -11.0 |
| O | ULTIMACC SYSTEMS INC | 1- 11 | 1 1/2 | + 1/2 | +50.0 |
| N | VARIAN ASSOCIATES | 10- 20 | 10 7/8 | - 1/4 | -2.2 |
| N | WANG LABS. | 13- 34 | 18 1/8 | -1 3/8 | -7.0 |
| N | XEROX CORP | 107-169 | 108 | -13 5/8 | -11.2 |
| | **LEASING COMPANIES** | | | | |
| A | BOOTHE COMPUTER | 1- 5 | 1 1/8 | 0 | 0.0 |
| O | BRESNAHAN COMP. | 1- 2 | 2 | 0 | 0.0 |
| O | COMDISCO INC | 4- 17 | 5 3/4 | -1 1/8 | -16.3 |
| O | COMMERCE GROUP CORP | 3- 5 | 4 3/4 | +1 1/8 | +31.0 |
| O | COMPUTER EXCHANGE | 1- 1 | 1/4 | - 1/8 | -33.3 |
| A | COMPUTER INVSTRS GRP | 2- 8 | 2 1/4 | + 1/4 | +12.5 |
| O | COMP. INSTALLATIONS | 1- 2 | 1 | 0 | 0.0 |
| M | DATRONIC RENTAL | 2- 3 | 1 3/8 | + 1/4 | +22.2 |
| A | DCL INC | 0- 3 | 5/8 | + 1/8 | +25.0 |
| A | DEARBORN-STORM | 12- 26 | 15 1/2 | -2 5/8 | -14.4 |
| N | DPF INC | 3- 9 | 3 1/2 | - 3/4 | -17.6 |
| O | EDP RESOURCES | 1- 3 | 3 1/4 | 0 | 0.0 |
| A | GRANITE MGT | 2- 6 | 2 1/2 | - 1/8 | -4.7 |
| A | GREYHOUND COMPUTER | 3- 6 | 5 7/8 | +2 | +51.6 |
| A | ITEL | 4- 12 | 4 5/8 | + 1/4 | +5.7 |
| N | LEASCO CORP | 8- 18 | 8 7/8 | -1 1/4 | -12.3 |
| O | LFASPAC CORP | 1- 8 | 1 3/8 | + 1/8 | +10.0 |
| O | LECTRO MGT INC | 1- 2 | 3/8 | + 1/8 | +50.0 |
| O | NRG INC | 3- 15 | 4 3/4 | + 1/2 | +11.7 |
| A | PIONEER TEX CORP | 4- 8 | 4 1/2 | 0 | 0.0 |
| A | ROCKWOOD COMPUTER | 1- 3 | 7/8 | 0 | 0.0 |
| N | U.S. LEASING | 16- 36 | 19 1/4 | - 3/4 | -3.7 |

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

| EXCH | | 1973-74 RANGE (1) | CLOSE JAN 10 1974 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| | **SOFTWARE & EDP SERVICES** | | | | |
| D | ADVANCED COMP TECH | 1- 2 | 1 1/2 | 0 | 0.0 |
| A | APPLIED DATA RES. | 2- 4 | 1 3/4 | - 1/8 | -6.6 |
| O | APPLIED LOGIC | 1- 3 | 3/8 | 0 | 0.0 |
| N | AUTOMATIC DATA PROC | 39- 94 | 51 | -5 7/8 | -10.3 |
| O | BRANDON APPLIED SYST | 1- 1 | 3/4 | 0 | 0.0 |
| O | CENTRAL DATA SYSTEMS | 3- 9 | 3 1/2 | 0 | 0.0 |
| O | COMPUTER DIMENSIONS | 1- 5 | 2 1/2 | + 1/4 | +11.1 |
| D | COMPUTER DYNAMICS | 1- 2 | 1/2 | 0 | 0.0 |
| D | COMPUTER HORIZONS | 1- 6 | 2 | 0 | 0.0 |
| O | COMPUTER NETWORK | 1- 5 | 1 | - 1/4 | -20.0 |
| N | COMPUTER SCIENCES | 2- 6 | 2 1/2 | + 1/8 | +5.2 |
| D | COMPUTER TASK GROUP | 1- 2 | 5/8 | - 1/8 | -16.6 |
| O | COMPUTER TECHNOLOGY | 1- 3 | 1/2 | 0 | 0.0 |
| O | COMPUTER USAGE | 3- 9 | 3 5/8 | + 1/4 | +7.4 |
| D | COMRESS | 1- 2 | 1/4 | + 1/8 | +100.0 |
| D | COMSHARE | 2- 9 | 2 1/4 | 0 | 0.0 |
| N | CORDURA CORP | 3- 15 | 3 | 0 | 0.0 |
| O | DATATAB | 1- 4 | 1 3/8 | + 1/8 | +10.0 |
| A | ELECT COMP PROG | 1- 2 | 1/2 | 0 | 0.0 |
| N | ELECTRONIC DATA SYS. | 20- 56 | 23 5/8 | + 1/8 | +0.5 |
| D | INFONATIONAL INC | 1- 2 | 3/8 | - 1/8 | -25.0 |
| D | INFORMATICS | 2- 6 | 5 5/8 | + 3/8 | +7.1 |
| D | I.D.A. DATA CORP | 1- 1 | 3/8 | 0 | 0.0 |
| O | IPS COMPUTER MARKET. | 1- 5 | 1 | + 1/8 | +14.2 |
| O | KEANE ASSOCIATES | 2- 5 | 2 | - 1/4 | -11.1 |
| D | KEYDATA CORP | 4- 12 | 5 5/8 | + 3/8 | +7.1 |
| O | LOGICON | 2- 7 | 2 1/8 | 0 | 0.0 |
| A | MANAGEMENT DATA | 1- 5 | 1 5/8 | + 1/4 | +18.1 |
| O | NATIONAL CSS INC | 18- 42 | 27 1/2 | -6 1/2 | -19.1 |
| O | NATIONAL COMPUTER CO | 1- 1 | 3/8 | 0 | 0.0 |
| O | NATIONAL INFO SRVCS | 1- 2 | 1/4 | 0 | 0.0 |
| P | ON LINE SYSTEMS INC | 12- 25 | 22 3/4 | -1 | -4.2 |
| N | PLANNING RESEARCH | 2- 7 | 2 7/8 | + 5/8 | +27.7 |
| O | PROGRAMMING METHODS | 17- 25 | 17 | 0 | 0.0 |
| O | PROGRAMMING & SYS | 1- 1 | 3/4 | + 1/8 | +20.0 |
| O | RAPIDATA INC | 3- 24 | 3 7/8 | -1 1/2 | -27.9 |
| O | SCIENTIFIC COMPUTERS | 1- 3 | 5/8 | 0 | 0.0 |
| O | SIMPLICITY COMPUTER | 1- 4 | 1 1/4 | + 1/8 | +11.1 |
| D | THS COMPUTER CENTERS | 2- 9 | 8 1/2 | 0 | 0.0 |
| O | TCC INC | 1- 1 | 1/2 | + 1/4 | +100.0 |
| D | TYMSHARE INC | 6- 13 | 7 7/8 | - 7/8 | -10.0 |
| D | UNITED DATA CENTER | 3- 6 | 3 1/4 | 0 | 0.0 |
| A | UPS SYSTEMS | 2- 8 | 3 | - 3/8 | -11.1 |
| N | WYLY CORP | 3- 11 | 4 1/4 | + 7/8 | +25.9 |
| | **PERIPHERALS & SUBSYSTEMS** | | | | |
| N | ADDRESSOGRAPH-MULT | 9- 34 | 9 3/4 | -1 | -9.3 |
| D | ADVANCED MEMORY SYS | 4- 23 | 4 | 0 | 0.0 |
| N | AMPEX CORP | 3- 7 | 3 3/8 | - 5/8 | -15.6 |
| O | ANDERSON JACOBSON | 2- 6 | 2 1/4 | + 1/4 | +12.5 |
| O | BEEHIVE MEDICAL ELEC | 4- 10 | 5 1/4 | + 3/4 | +16.6 |
| A | BOLT,BERANEK & NEW | 6- 12 | 7 5/8 | + 1/8 | +1.6 |
| N | BUNKER-RAMO | 6- 18 | 7 1/2 | + 1/8 | +1.6 |
| A | CALCOMP | 5- 16 | 7 7/8 | -1 1/4 | -13.6 |
| D | CAMBRIDGE MEMORIES | 8- 17 | 14 1/2 | - 1/2 | -3.3 |
| O | CENTRONICS DATA COMP | 13- 38 | 17 1/2 | -1 1/4 | -6.6 |
| O | CODEX CORP | 8- 19 | 9 1/2 | -1 | -9.5 |
| D | COGNITRONICS | 1- 3 | 1/2 | 0 | 0.0 |

| EXCH | | 1973-74 RANGE (1) | CLOSE JAN 10 1974 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| O | COMPUTER COMMUN. | 1- 4 | 1 1/8 | + 3/8 | +50.0 |
| A | COMPUTER EQUIPMENT | 1- 3 | 2 | + 1/8 | +6.6 |
| O | COMPUTER MACHINERY | 4- 13 | 4 1/2 | - 1/8 | -2.7 |
| O | COMPUTER TRANSCEIVER | 1- 6 | 1 7/8 | + 1/8 | +7.1 |
| N | CONRAC CORP | 13- 32 | 14 1/8 | - 1/8 | -0.8 |
| O | DATA ACCESS SYSTEMS | 1- 3 | 1 1/8 | 0 | 0.0 |
| O | DATA 100 | 9- 19 | 10 1/8 | -1 1/4 | -10.9 |
| A | DATA PRODUCTS CORP | 2- 5 | 3 | - 1/2 | -14.2 |
| O | DATA RECOGNITION | 2- 3 | 1 1/2 | 0 | 0.0 |
| O | DATA TECHNOLOGY | 1- 5 | 2 | - 1/4 | -11.1 |
| O | DECISION DATA COMPUT | 6- 40 | 6 | - 3/4 | -11.1 |
| O | DELTA DATA SYSTEMS | 1- 1 | 1/2 | + 1/8 | +33.3 |
| O | DIVAN CONTROLS | 1- 4 | 1 1/2 | + 1/2 | +50.0 |
| N | ELECTRONIC M & M | 3- 6 | 3 3/8 | - 3/8 | -10.0 |
| O | FABRI-TEK | 2- 5 | 2 3/8 | + 3/8 | +18.7 |
| O | GENERAL COMPUTER SYS | 3- 9 | 3 | - 1/4 | -7.6 |
| N | GENERAL ELECTRIC | 56- 76 | 60 | -3 3/8 | -5.3 |
| N | HAZELTINE CORP | 4- 9 | 4 3/4 | + 1/4 | +5.5 |
| O | INFOPEX INC | 3- 23 | 4 1/8 | -1 1/8 | -21.4 |
| O | INFORMATION DISPLAYS | 1- 2 | 1/2 | + 1/4 | +100.0 |
| O | INFORMATION INTL INC | 8- 15 | 11 1/4 | -2 3/4 | -19.6 |
| A | LUNDY ELECTRONICS | 3- 9 | 2 7/8 | 0 | 0.0 |
| O | MANAGEMENT ASSIST | 1- 1 | 1/4 | 0 | 0.0 |
| N | MEMOREX | 2- 19 | 1 7/8 | - 1/4 | -11.7 |
| A | MILGO ELECTRONICS | 14- 28 | 14 1/8 | -1 1/2 | -9.5 |
| N | MOHAWK DATA SCI | 2- 13 | 3 | + 5/8 | +26.3 |
| O | ONEC COMPUTER SYST. | 2- 6 | 2 5/8 | 0 | 0.0 |
| O | OPTICAL SCANNING | 2- 8 | 3 | + 1/2 | +20.0 |
| O | PERTEC CORP | 3- 8 | 4 3/8 | - 3/8 | -7.8 |
| O | PHOTON | 3- 7 | 3 3/4 | 0 | 0.0 |
| A | POTTER INSTRUMENT | 2- 9 | 3 | - 5/8 | -17.2 |
| O | PRECISION INST. | 2- 6 | 1 3/4 | + 1/4 | +16.6 |
| O | QUANTOR CORP | 4- 10 | 4 1/2 | - 1/4 | -5.2 |
| O | RECOGNITION EQUIP | 2- 8 | 3 | + 1/2 | +20.0 |
| N | SANDERS ASSOCIATES | 6- 18 | 7 1/8 | - 1/8 | -1.7 |
| O | SCAN DATA | 1- 6 | 1 3/4 | 0 | 0.0 |
| O | STORAGE TECHNOLOGY | 11- 34 | 12 | -2 | -14.2 |
| O | SYCOP INC | 9- 20 | 8 3/4 | -2 | -18.6 |
| O | TALLY CORP. | 2- 14 | 2 1/8 | 0 | 0.0 |
| D | TEC INC | 5- 9 | 5 3/4 | - 1/4 | -4.1 |
| N | TEKTRONIX INC | 30- 55 | 36 | -6 1/2 | -15.2 |
| N | TELEX | 3- 8 | 3 1/4 | 0 | 0.0 |
| O | WANGCO INC | 7- 13 | 8 3/4 | - 1/8 | -1.4 |
| O | WILTEK INC | 7- 18 | 7 | -1 | -12.5 |
| | **SUPPLIES & ACCESSORIES** | | | | |
| O | BALTIMORE BUS FORMS | 5- 9 | 5 | 0 | 0.0 |
| A | BARRY WRIGHT | 5- 13 | 5 1/4 | - 1/8 | -2.3 |
| O | CYBERNATICS INC | 1- 3 | 1 1/8 | 0 | 0.0 |
| A | DATA DOCUMENTS | 17- 26 | 23 | - 5/8 | -2.6 |
| O | DUPLEX PRODUCTS INC | 6- 10 | 7 1/8 | + 3/8 | +5.5 |
| N | ENNIS BUS. FORMS | 5- 8 | 5 3/4 | 0 | 0.0 |
| O | GRAHAM MAGNETICS | 7- 20 | 8 1/4 | + 1/4 | +3.1 |
| O | GRAPHIC CONTROLS | 7- 12 | 7 3/8 | - 1/8 | -1.6 |
| N | 3M COMPANY | 71- 91 | 72 5/8 | -6 5/8 | -8.3 |
| O | MOORE CORP LTD | 51- 65 | 50 3/4 | -5 3/4 | -10.1 |
| N | NASHUA CORP | 36- 58 | 41 1/2 | -2 3/4 | -6.2 |
| O | PENNOLOS & PENNOLO | 26- 51 | 28 | -2 1/2 | -8.1 |
| O | STANDARD REGISTER | 11- 20 | 12 1/2 | - 1/4 | -1.9 |
| O | TAB PRODUCTS CO | 7- 23 | 7 | 0 | 0.0 |
| N | UARCO | 15- 23 | 16 3/4 | + 3/4 | +4.6 |
| A | WABASH MAGNETICS | 5- 8 | 6 1/8 | - 1/4 | -3.9 |
| N | WALLACE BUS FORMS | 15- 26 | 15 | 0 | 0.0 |

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